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OF THE
FACTORY
INVESTIGATING
COMMISSION
1913

VOLUME II.

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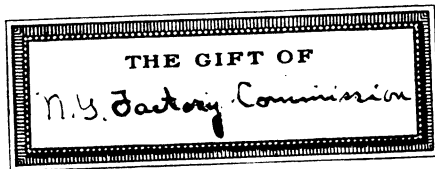
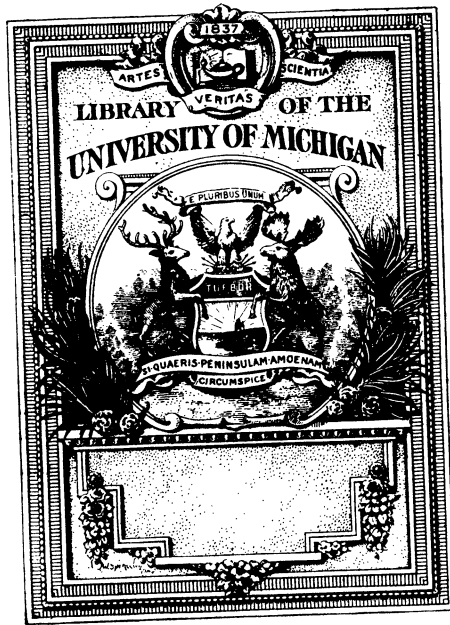
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STATE OF NEW YORK

SECOND REPORT

OF THE

FACTORY INVESTIGATING COMMISSION

1913

VOLUME II

APPENDICES TO REPORT

TRANSMITTED TO THE LEGISLATURE JANUARY 15, 1913

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1913



STATE OF NEW YORK

No. 36

IN SENATE

JANUARY 15, 1913

SECOND REPORT

OF THE

New York State Factory Investigating Commission

January 15, 1913

ROBERT F. WAGNER

Chairman

ALFRED E. SMITH

Vice-Chairman

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Secretary

GEORGE M. PRICE, M.D.

Director of Investigation

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APPENDIX II

GENERAL REPORT

of the

DIRECTOR OF INVESTIGATION

BY

GEORGE M. PRICE, *M. D.*



NEW YORK CITY, *January 1st, 1913.*

HON. ROBERT F. WAGNER, CHAIRMAN *New York State Factory
Investigating Commission New York City:*

DEAR SIR:

I have the honor to transmit herewith my General Report of the sanitary investigation of "existing conditions under which manufacture is carried on in the cities of this state, as to matters affecting the health and safety of operatives."

The investigations were made under my direction, pursuant to a resolution adopted by your Commission on September 11th, 1911.

The complete report consists of two parts; one, a General Report of seven (7) chapters; the other, a compilation of six (6) Special Reports.

The General Report contains the following chapters:

1. The Scope, Organization and Work of the Investigation.
2. A Survey of Conditions under which Manufacture is carried on.
3. Night Work of Women.
4. The Chemical Industry.
5. The Tobacco Industry.
6. The Printing Industry.
7. Miscellaneous Reports.

The Special Reports are as follows:

- I. Wood Alcohol, by Professor Charles Baskerville.
- II. Commercial Acids, by Dr. Charles F. McKenna.
- III. Lead Works and Lead Poisoning, by Dr. C. T. Graham-Rogers.
- IV. The Canneries in New York State, by Zenas L. Potter.
- V. Manufacturing in Tenements, by Elizabeth C. Watson.
- VI. Mercantile Establishments, by Pauline Goldmark.

Respectfully submitted,

GEORGE M. PRICE, M. D.,

Director of Investigation.

Report of the Director of Investigation

CHAPTER I

THE SCOPE, ORGANIZATION AND WORK OF THE INVESTIGATION.

PRELIMINARY WORK IN 1911:

The work of investigation accomplished during 1911 by the New York State Factory Investigating Commission has been fully described in the Preliminary Report of the Commission published in 1912.

A general survey of the field was completed during the investigation of 1911; it lasted less than three months. This examination comprehended inspection of the sanitary conditions of a considerable number of industrial establishments in New York State, covering in extent New York City and a few cities of the first and second class. Besides this investigation special studies of fire protection, industrial poisons and home work in tenements were made to be supplemented later by the more intensive inquiries of 1912.

The investigation of 1911 embraced nine cities, twenty industries, 1,836 industrial establishments and 3,001 individual shops. Besides the regular work of investigations and the special inquiries carried on by the Commission, a comprehensive examination of 500 cellar bakeries was made, and complemented by a physical examination of 800 bakers.

TABLE NO. I.
NUMBER OF MANUFACTURING ESTABLISHMENTS AND WORKERS INSPECTED IN 1911 COMPARED
WITH ACTUAL NUMBER OF ESTABLISHMENTS AND WORKERS IN STATES.*

	NUMBER INVESTIGATED.		NUMBER IN STATE.	
	Estab- lishments.	Wage earners.	Estab- lishments.	Wage earners.
Printing.....	293	6,659	4,426	63,120
Tobacco.....	100	2,677	3,371	30,019
Chemicals.....	93	1,739	293 ¹	14,267
<i>Foodstuffs:</i>				
Bread.....	417	3,021	3,978	21,357
Candy.....	54	1,810	249 ²	8,570
Ice Cream.....	5	50	.....	.....
Pickles.....	6	470	790	7,075
Spices and Drugs.....	8	341	86 ³	2,504
Sugar Refineries.....	3	3,400	5	.....
Meat Packing.....	5	987	238	6,110
Mineral Waters.....	51	443	241 ¹	1,377
<i>Women's Trades:</i>				
Artificial Flowers and Feathers....	94	1,891	319	8,493
Laundries.....	110	7,082	1,529 ¹	16,631
Paper Boxes.....	55	2,595	315	11,538
Clothing (Women's).....	200	11,582	3,083	98,104
<i>Miscellaneous:</i>				
Corks.....	19	611	32	835
Rag Sorting.....	10	331	.....	.....
Textiles.....	7	1,613	798	82,007
Human Hair.....	67	547	132	2,313
Dyeing and Cleaning.....	19	929	(4)	.....
Other Trades.....	222	14,696	25,052	629,571
	1,838	63,374	44,935	1,003,891

¹ Figures taken from State Dept. Labor, 1910.

² Includes ice cream factories.

³ Includes coffee-grinding establishments.

⁴ Figures not given in Census Report.

* U. S. Census, 1910, Bulletin on Manufactures, pp. 54-59.

THE CONTINUATION OF THE INVESTIGATION IN 1912:

By chapter 21 of the Laws of 1912, the New York State Factory Investigating Commission was continued for another year. Its field of investigation was extended to all the cities in the state, and its scope was broadened so as to include mercantile establishments.

With the scope and field of the work thus increased, it was not to be expected that the Commission would be able to "complete its labors" within the allotted year. The task of a thorough investigation of several hundred industries and of nearly 45,000 industrial establishments is one that could not possibly be completed within one year. The extent of the field is so wide, the scope of industrial life is so broad, and the conditions under which labor is carried on are so many and various, that no investigation could possibly be brought to an end in so short a time. The

best that could be done was to lay a broad foundation for the study of industrial conditions and to investigate the most important ills of industrial life in order to be able to recommend practical measures for immediate relief.

The character of the investigation of industrial conditions undertaken by the Commission was neither academic nor muck-raking. It was my purpose to make it as extensive as possible with the means at hand and with the time at our disposal, and correspondingly intensive without going into minute details and technical descriptions impossible in a general inquiry.

The plan adopted for the investigations this year closely followed that adopted in 1911. There were two general divisions of the work:

First. General Sanitary Investigations.

Second. Special Investigations.

Table No. II shows the number of manufacturing establishments and workers inspected in 1912.

Table No. III shows the number of establishments and workers inspected during 1911 and 1912.

TABLE NO. II.
NUMBER OF MANUFACTURING ESTABLISHMENTS AND WORKERS INSPECTED IN 1912.

	NUMBER INVESTIGATED.	
	Establishments.	Wage earners.
Clothing.....	141	16,639
Chemicals, paints and illuminants.....	34	3,025
<i>Foodstuffs:</i>		
Bread and other bakery products.....	42	798
Candy.....	15	1,279
Ice Cream.....	12	98
Mineral waters.....	33	457
Sausages and meat packing.....	68	737
Miscellaneous.....	10	1,543
Furs.....	253	3,985
Gloves (kind not specified).....	33	2,487
Hats and caps.....	32	3,195
Laundries.....	14	676
Leather and rubber goods.....	41	6,644
Metal.....	130	25,840
Paper boxes and paper products.....	37	2,941
Printing.....	55	2,388
Stone, glass and clay.....	19	1,965
Textiles.....	125	33,660
Tobacco.....	151	12,917
Woodwork.....	28	1,495
Miscellaneous.....	65	3,192
	*1,338	125,961

* This does not include 400 establishments which were inspected during December, 1912, in Rochester, N. Y.

TABLE NO. III.
NUMBER OF MANUFACTURING ESTABLISHMENTS AND WORKERS INSPECTED IN 1911 AND 1912
COMPARED WITH ACTUAL NUMBER OF ESTABLISHMENTS AND WORKERS IN STATE.

	TOTAL NUMBER INVESTIGATED.		TOTAL NUMBER IN STATE.		PER CENT. OF TOTAL NUMBER IN STATE.	
	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.	Estab-lish-ments.	Wage earners.
Clothing.....	341	28,221	6,066	189,467	5.6	14.9
Drugs and chemicals.....	127	4,764	1	.....	.....	.....
<i>Foodstuffs:</i>						
Bread and other bakery products.....	459	3,819	3,978	21,357	11.5	17.9
Candy.....	69	3,089	259 ²	149,325	26.6	33.1
Ice cream.....	17	148	(3)	.....	.....	.....
Mineral waters.....	84	900	594	(3)	14.1	.....
Sausages and meat pack- ing.....	73	1,724	1	.....	.....	.....
Miscellaneous.....	27	5,767 ⁴	1	.....	.....	.....
Flowers and feathers.....	94	1,891	319	8,493	29.5	22.3
Furs.....	253	3,985	915	8,999	27.6	44.3
Gloves (kind not specified)..<	33	2,478 ³	225 ⁴	7,195	14.7	34.4
Hats and caps.....	32	3,195	1	.....	.....	.....
Human hair.....	67	547	132	2,313	50.7	23.6
Laundries.....	124	7,758	1,529 ⁵	16,631	8.1	46.6
Leather and rubber goods... Metal.....	41 130	6,644 25,840	1 1	..........	..........	..........
Paper boxes and paper prod- ucts.....	92	5,536	315 ⁶	11,538	29.2	48.0
Printing.....	348	9,047	4,426	63,120	7.9	14.3
Stone, glass and clay.....	19	1,965	1	.....	.....	.....
Textiles.....	132	35,173	798	82,007	16.5	42.9
Tobacco.....	251	15,594	3,371	30,019	7.4	51.9
Woodwork.....	28	1,495	1	.....	.....	.....
Other trades.....	335	19,759	1	.....	.....	.....
	73,176	189,335	44,935	1,003,981	7.1	18.8

¹ Not same classification.

² Include large ice cream factories.

³ Figures not given in Census Bulletin.

⁴ Only leather gloves and mittens.

⁵ Figures taken from State Department of Labor, 1910.

⁶ Census includes fancy boxes also.

⁷ To this add 400 establishments inspected in Rochester December, 1912.

GENERAL SANITARY INVESTIGATIONS.

A general sanitary investigation has been made of the following conditions:

- (1) Location and Construction of Factories.
- (2) Fire Dangers.
- (3) Safeguarding of Machinery.
- (4) Light and Illumination.
- (5) Heat and Ventilation.
- (6) Water Supply and Washing Service.
- (7) Toilet Accommodations.
- (8) Dressing and Lunch Rooms.
- (9) General Cleanliness.

The General Sanitary Inspection was made by a staff of six inspectors. The itinerary of the inspectors included most of the important cities of the state. Besides the investigations made by these six inspectors, a number of establishments were examined by special investigators and experts employed by the Commission.

Personally, I have made tours of inspection throughout the state, including in my investigation several typical establishments of each important industry. Besides the number of cities which were visited by the special investigators of wood alcohol, lead works and the chemical trades, forty-five cities in the state were included in our general investigation.

In some of the cities the investigations were more thorough and exhaustive than in others. The extent of the investigation depended upon many conditions. In certain cities but few industrial establishments were inspected; in others, quite a large number. The percentage of establishments investigated ranged from two or three in a city to 29.2 per cent of the establishments. The percentage of wage earners in these establishments varied from 5% to 97.7% of the total population.

Table No. IV shows the number of establishments, shops and wage earners inspected, compared with the actual number of establishments and wage earners in the forty-five cities.

TABLE NO. IV.

NUMBER OF ESTABLISHMENTS, SHOPS AND WAGE EARNERS INSPECTED COMPARED WITH ACTUAL NUMBER OF ESTABLISHMENTS, AND WAGE EARNERS IN THE FORTY-FIVE CITIES.

CITIES.	Population.	NUMBER IN CITY.		NUMBER INVESTIGATED.			PER CENT. TO TOTAL NUMBER IN CITY.	
		Establish-ments.	Wage Earners.	Establish-ments.	Shops.	Wage Earners.	Establish-ments.	Wage Earners.
Albany.....	100,253	395	9,861	2	2	500	0.5	5.1
Amsterdam.....	31,267	97	10,284	14	99	8,068	14.4	78.4
Auburn.....	34,668	140	6,497	8	82	3,355	5.7	82
Batavia.....	11,613	59	2,007	6	23	1,962	10.2	55.0
Buffalo.....	423,715	1,753	51,412	114	251	12,531	6.5	97.7
Cohoes.....	24,709	103	8,209	23	77	3,331	22.3	24.3
Cortland.....	11,504	51	2,386	6	16	3,290	40.6	40.6
Depew.....	3,921	1	.....	5	13	2,178	11.8	12.3
Dunkirk.....	17,221	57	2,756	2	3	678	3.5	13.7
Eastwood.....	810	1	.....	2	15	39	.....	.....
Elmira.....	37,176	154	3,647	9	31	1,843	5.8	50.5
Fulton.....	2,141	1	.....	1	5	282	.....	.....
Franklin Landing.....	3,902	187	5,741	16	44	1,359	8.6	23.7
Gloversville.....	20,642	45	1,302	13	32	2,578	28.9	.....
Hudson.....	11,417	1	.....	1	.....	2,500	.....	.....
Ilion.....	6,588	156	6,789	8	55	2,351	5.1	34.6
Jamestown.....	31,297	138	2,589	25	55	1,334	18.1	51.5
Johnstown.....	10,447	99	3,281	6	17	1,495	6.1	45.5
Kingston.....	25,908	1	.....	4	34	860	.....	.....
Lansingburgh.....	12,273	55	4,211	8	32	712	14.5	16.9
Little Falls.....	17,870	109	2,138	6	13	624	5.5	29.2
Lockport.....	917	1	.....	1	9	241	.....	.....
Marcellus.....	6,727	1	.....	1	6	455	.....	.....
Mattawean.....	30,919	80	1,207	11	19	404	12.2	33.4
Mount Vernon.....	27,805	104	4,344	12	35	2,278	11.5	52.4
Newburgh.....	28,867	42	735	10	23	635	23.8	86.4
New Rochelle.....	4,766,883	25,938	554,002	2,455	3,966	84,676	9.5	15.3
New York.....	30,445	156	6,089	20	101	5,387	12.8	88.5
Niagara Falls.....	30,445	156	6,089	20	101	5,387	12.8	88.5

¹ Not given in Bulletin on Manufactures, 1910.

² Not given in Bulletin on Population, 1910.

XIII Census; Bulletin on Population, pp. 23-25; Bulletin on Manufactures, pp. 60-81; Albany, Buffalo, New York, Niagara Falls, Schenectady, and Syracuse include some of the special investigations not included in the general investigation tables.

TABLE NO. IV — *Concluded.*

NUMBERS OF ESTABLISHMENTS, SHOPS AND WAGE EARNERS INSPECTED COMPARED WITH ACTUAL NUMBER OF ESTABLISHMENTS, AND WAGE EARNERS IN THE FORTY-FIVE CITIES.

CITIES.	Population.	NUMBER IN CITY.		NUMBER INVESTIGATED.			PER CENT. TO TOTAL NUMBER IN CITY.	
		Establish-ments.	Wage Earners.	Establish-ments.	Shops.	Wage Earners.	Establish-ments.	Wage Earners.
Oneida.....	8,317 ¹	1	.....	7	21	511	.....	.....
Oswego.....	23,368 ¹	81	3,817	7	30	1,487	8.6	39.0
Peekskill.....	15,245	52	2,055	8	25	1,643	15.4	80.0
Poughkeepsie.....	27,936	111	3,299	20	56	2,734	18.0	82.9
Rochester.....	218,149	1,203	39,108	70	184	6,672	17.1	17.1
Rome.....	20,497	119	3,633	12	126	2,526	10.1	69.5
Schenectady.....	72,826	134	14,931	10	10	5,000	6.5	33.5
Syracuse.....	137,249	738	18,148	96	216	11,606	13.0	63.9
Tonawanda.....	8,200	1	.....	6	10	699	.....	.....
Troy.....	76,813	363	20,020	51	141	5,492	14.0	27.4
Utica.....	74,419	317	13,153	87	217	12,584	27.4	95.7
Van Schaick Island.....	2	1	.....	1	1	17	.....	.....
Wappingers Falls.....	3,195	1	.....	2	6	700	.....	.....
Watervliet.....	15,074	36	753	4	11	457	11.1	60.7
Whiteboro.....	2,375	1	.....	1	2	399	.....	.....
Yonkers.....	79,803	158	12,711	29	105	6,120	18.4	48.1
The rest of the State.....	2,597,718	11,695	182,896	.....	.....	.....	.....	.....
Total in State.....	9,113,279	44,935	1,003,981	3,203	6,102	201,138	7.1	20.0

¹ Not given in Bulletin on Manufactures, 1910.

² Not given in Bulletin on Population, 1910.

XIII Census; Bulletin on Population, pp. 23-25; Bulletin on Manufactures, pp. 60-81; Albany, Buffalo, New York, Niagara Falls, Schenectady and Syracuse include some of the special investigations not included in the general investigation tables.

SPECIAL INVESTIGATIONS.

A number of special inquiries have been conducted under my direction, and a report on these conditions is presented in the General Report of the Director of Investigation.

The special investigations that were made are as follows:

- (1) Night Work of Women.
- (2) The Chemical Industry.
- (3) The Tobacco Industry.
- (4) The Printing Industry.

The following Special Reports are separately submitted to the Commission:

- I. Wood Alcohol, by Professor Charles Baskerville.
- II. Commercial Acids, by Dr. Charles F. McKenna.
- III. Lead Works and Lead Poisoning, by Dr. C. T. Graham-Rogers.
- IV. The Canneries in New York State, by Zenas L. Potter.
- V. Manufacturing in Tenements, by Elizabeth C. Watson.
- VI. Mercantile Establishments, by Pauline Goldmark.

(1) *Night Work of Women:*

For some time the night work of women has been the subject of earnest discussion before Legislatures and Courts. The prohibition of night work has been advocated by a large number of persons, and numerous legislative acts have been passed on the subject. It has been prohibited in England, Germany, France, Holland, Switzerland, Austria-Hungary, Italy, Luxemburg, Portugal, Sweden and Bulgaria.

Some inquiries have been made by the Commission on the extent of night work industries throughout the state. One especially conspicuous instance of prolonged night work regularly conducted throughout the year has been found in one of the cities of the state. It was therefore deemed necessary to make a special study of the conditions under which these women night workers labored, and a special investigation was made by Miss Grace Potter and Miss Gertrude E. Smith, who have taken the personal histories of one hundred night workers. The report of these individual investigations will be found in chapter 3.

(2) *The Chemical Industry:*

In the processes of no other industry are there so many dangerous elements as in the manufacture of chemicals. In this trade excessive dust, extremely high temperature, and the presence of gases, fumes and various poisons often injuriously affect the workers.

During the investigation of 1912, Inspectors John Vogt of the Department of Labor, and Stuart Owen, both competent chemists, inspected ninety-three chemical establishments. To these were added the forty-nine plants which I inspected with the assistance of Dr. Charles F. McKenna and Dr. Frederick Breithut during an extended tour throughout the state.

Besides the sanitary inspection, special investigations were made of industrial accidents and the effect of lead poisoning in the various chemical establishments. These investigations were made by Miss Gertrude E. Smith and Miss Grace Potter. Mrs. Orenstein of the Labor Department has also taken the history of one hundred and thirty-two individual workers in some of the dangerous branches of the chemical factories at Niagara Falls, New York.

The electro-thermal and electro-chemical industries have become established in Niagara Falls, New York, within the last decade owing to the proximity of cheap electrical power, and are carried on in great industrial plants which employ largely foreign unskilled labor. In these establishments there has been considerable progress in the utilization of natural resources, but it has not been accompanied by improved operating conditions. The evils of the modern factory system are nowhere so accentuated as in these huge factories where extreme temperatures, excessive dust, industrial poisons, gases and fumes are daily undermining the health of the operatives. A more detailed report on these establishments and on the chemical industry is presented in Chapter IV.

(3) *The Tobacco Trade:*

During 1912, our inspectors added a considerable number of establishments in the tobacco trade to those already inspected in 1911. Besides the sanitary inspection of the factories themselves, it was also deemed of interest to make a physical examination of

the women workers in the trade. Six hundred workers in various tobacco factories have been physically examined by Dr. Fanny Dembo, a competent woman physician. This is the first medical examination that has ever been made of so large a number of woman workers in factories. A report on the sanitary investigation of tobacco factories, with a special report by Dr. Dembo on the physical examination of the six hundred workers is presented in Chapter V.

(4) *The Printing Trade:*

During 1911, 293 printing establishments were inspected by our regular inspectors, but owing to lack of time no report on this subject was presented.

A number of additional establishments have been inspected during this year. A special report on the trade will be found in Chapter VI.

SPECIAL REPORTS.

Several important studies were made for the Commission by experts and Special Reports of these are herewith submitted as follows:

I. *Wood Alcohol:*

An important study was made for the Commission on the subject of wood alcohol, or methyl, and its effect on workers. Within the last two years, there have been reported a number of cases in which blindness and death have resulted from the inhalation of the fumes of wood alcohol. The manufacture and use of wood alcohol is strictly regulated in a number of states in this country, and also abroad.

The report of this subject was made by Professor Charles Baskerville of the College of the City of New York. Professor Baskerville assigned Dr. Frederick Breithut for the work of inspection. Dr. Breithut and I have visited throughout the state a large number of industrial establishments in which methyl is manufactured or used in processes of manufacturing.

II. *Commercial Acids:*

The manufacture and use of many of the commercial acids are of special danger to workers in certain industrial establishments.

Dr. Charles F. McKenna was retained as Chemical Counsel by the Commission for the investigation, and his report on this subject is presented to the Commission.

III. *Lead Works and Lead Poisoning:*

During 1911 a valuable study of the lead works in New York city was made by Dr. E. E. Pratt, whose findings appear in the Preliminary Report of the Commission.

During the current year, an additional investigation of a large number of lead works and establishments where lead is used in the process of manufacture has been made throughout the State by Dr. C. T. Graham-Rogers. Dr. Rogers has been assigned to the Commission for this work by the courtesy of the Commissioner of Labor, Mr. John Williams, and was ably assisted by Inspector John Vogt, also of the Department of Labor. This study of lead works is supplemented by a description of a number of cases of lead poisoning which were traced by our investigators, Miss Grace Potter and Miss Gertrude E. Smith. The investigations of Dr. Rogers and Inspector Vogt are embraced in a special report to the Commission.

IV. *The Canneries in New York State:*

For a number of years, the conditions of the workers in the canneries throughout the state has been brought to the attention of the Legislature, with a view to preventive and restrictive legislation. It has been claimed by various investigators that women are subjected to long hours of labor in the canneries; that a large number of very small children are employed therein; that low wages are paid and that the general operating conditions during the rush season are inimical to the health and dangerous to the lives of the workers.

During the last session of the Legislature, the canneries were exempted from the 54-hour labor law for women.

In the canneries we find the anomalous condition that certain parts of the establishments are entirely exempt from legal restrictions because according to the opinion of a former Attorney-General, they were declared to be "sheds" and not "factories."

As this question of exemption for the canneries will inevitably come up before future legislatures, it was deemed advisable to

make a thorough investigation of the canneries and the conditions of labor therein so as to determine all the facts in order to suggest such remedial legislation as would be just to the employers while effectively guarding the health and lives of the employees. The following questions were presented for investigation:

(1) Are women subjected to unduly long hours of labor in canneries?

(2) Is the employment of women for unusually long hours absolutely necessary for the industry?

(3) Are children between six and fourteen years habitually employed in the canneries for a large part of the day?

(4) Is such employment of children between six and fourteen absolutely necessary for the industry?

(5) Should any parts of the factory wherein work is being done be exempt from the ordinary labor laws because one or all of the walls are open? In other words, should the sheds be exempt from the operation of the factory law?

(6) Should any exemption be allowed canneries where women are employed because of the seasonal character of the work?

(7) What should such exemption or exemptions be?

The work of investigation of the canneries was entrusted to Mr. Zenas L. Potter, who was thoroughly conversant with the subject from previous investigations. Mr. Potter was assisted by a staff of nine investigators, some of whom were employed as official investigators of canneries, while others worked in the canneries as employees in order to verify certain statements made by the employers. Much data has been gathered from the official books, time records, etc., of the employers and a thorough investigation of the whole situation has been made. A special report on the subject is presented by Mr. Potter.

V. *Manufacturing Tenements:*

Our preliminary examination during 1911 has shown the vast extent of the work in tenement houses, work in which a large number of women and many children of very tender ages are employed. The investigations during 1912 have clearly proved that the problem of home work is concentrated largely in New

York City and Brooklyn; however, it exists in two or three other large cities.

The dangers of home work are manifold. It is dangerous to the health of the workers themselves, it encourages the work of married women and very young children, it interferes with the proper sanitation of the homes, it lowers the wage standard of factory workers, and it also endangers the health of the consumers by the possibility of spreading infection.

While the best remedy for this industrial condition would be its total abolition, by prohibiting factories from employing out-workers, this can hardly be accomplished at once. The best that can be recommended at present, is a gradual abolition of some branches of home work and a strict regulation of tenement house work by legislation, licensing, inspection and strict enforcement of the law.

The work of investigation of tenement house labor was in charge of Miss Elizabeth C. Watson, who has had large experience in this work, Miss Watson with a staff of workers has made an investigation throughout the state and in New York City. Her report upon the subject is separately submitted.

VI. *Mercantile Establishments:*

The subject of mercantile establishments and their relation to the Labor Department has been included within the scope of our investigation by chapter 21 of the Laws of 1912.

A number of cities have been visited, and an investigation of mercantile establishments has been made. A special inquiry has been conducted under the direction of Miss Pauline Goldmark of the Consumers League. A special report on this subject is presented to the Commission by Miss Goldmark.

Personal:

The Director of the investigation has been fortunate in having the assistance of a staff of investigators who were competent, industrious and enthusiastic in their work.

Experts Retained by the Commission:

Professor Charles Baskerville of the College of the City of New York was engaged for the purpose of making a study of

wood alcohol and the effects upon the workers of its manufacture and use in arts and crafts. How thoroughly and scientifically the work has been accomplished is shown in his report.

Dr. Charles F. McKenna was engaged to conduct an inquiry into the manufacture and uses of various commercial acids and their effects upon the health of those employed in their use and manufacture, and his report on the subject has been submitted to the Commission.

The physical examination of the six hundred female tobacco workers was made by Dr. Fanny Dembo with the assistance of Dr. Anna Aronovich. The valuable report of Dr. Dembo is included in Chapter V of the General Report.

Dr. Otto Glogau, a competent otologist, has kindly volunteered to make for the Commission a special study of the effects of noise upon the ears of workers, and his paper is included in the General Report in chapter VII.

The Assistance of the Department of Labor:

To the Honorable John Williams, Commissioner of Labor, the Commission is deeply indebted for his valued co-operation in assigning some of his best inspectors to the work of our investigation.

Dr. C. T. Graham-Rogers and Inspector John Vogt were assigned by the Commissioner to make a special study of lead works for the Commission, and they have in this capacity visited a large number of establishments in the cities throughout the state.

Mrs. Marie S. Orenstein, a factory inspector for the Department of Labor, was assigned to us for general inspectorial service by Honorable John Williams. Her work has been very satisfactory, and her special investigations are included in the report.

Inspector George Cangialosi was assigned by Honorable John Williams for two months work in the tenement house investigation, and his work was thoroughly satisfactory.

Special Investigators:

Mr. Zenas L. Potter's work as Chief Investigator of the canneries speaks for itself. Miss Elizabeth C. Watson had charge of the home work investigation.

Miss Grace Potter and Miss Gertrude E. Smith made special investigations for the Commission in tracing lead poisoning cases, accident cases and individual histories in various cities of New York State. Their work was very arduous and at times fraught with danger to themselves. It was however accomplished competently and skilfully.

The work of supervising the inspectorial force in the general sanitary investigation was done by Inspector John J. Sullivan. Mr. Sullivan has been an Inspector in the Health Department of New York city for over twenty years. His training and experience were such as to make him a highly valuable chief of inspectors.

CHAPTER II

EXISTING CONDITIONS UNDER WHICH MANUFACTURING IS CARRIED ON IN THE STATE.

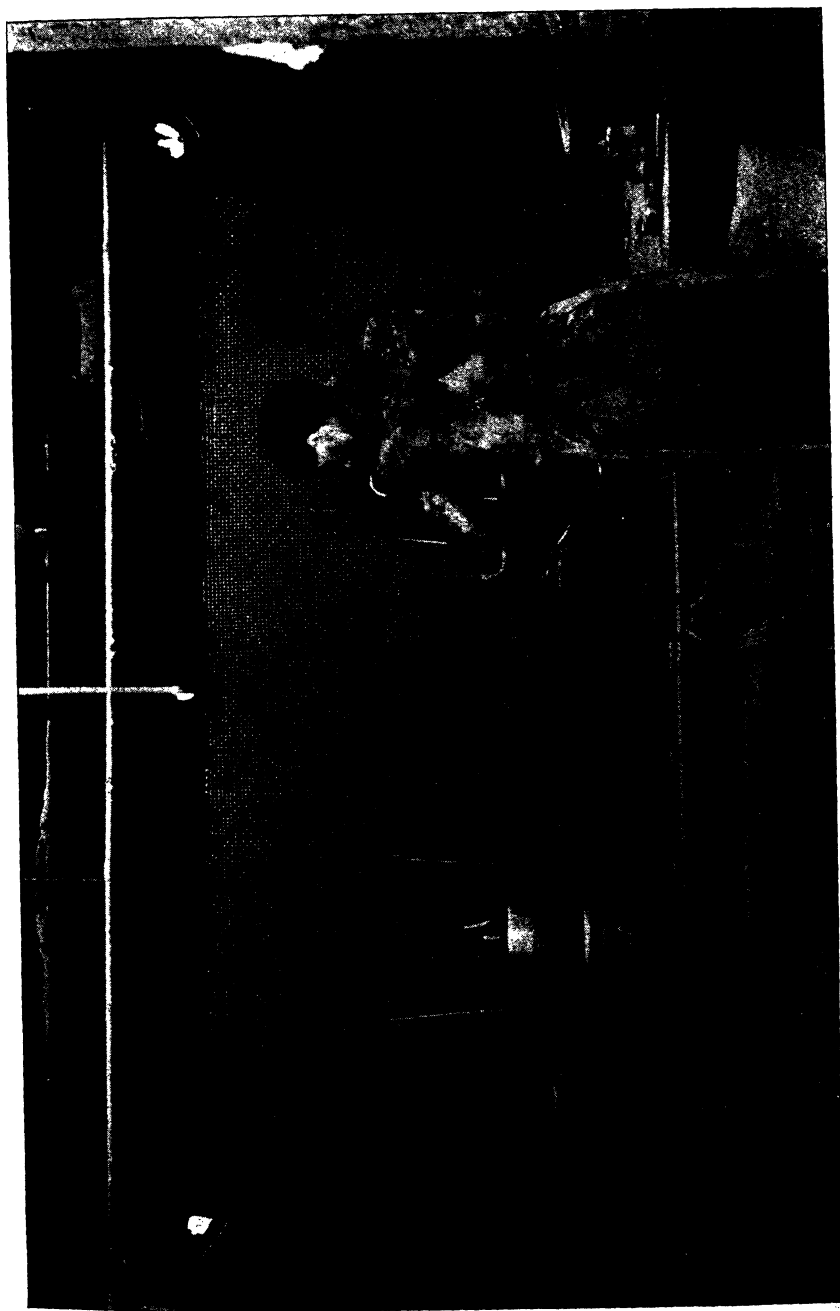
I.

The conditions under which manufacture is carried on in the industrial establishments throughout the state are of paramount importance to the health of the workers. The health of the workers is the greatest asset of the state.

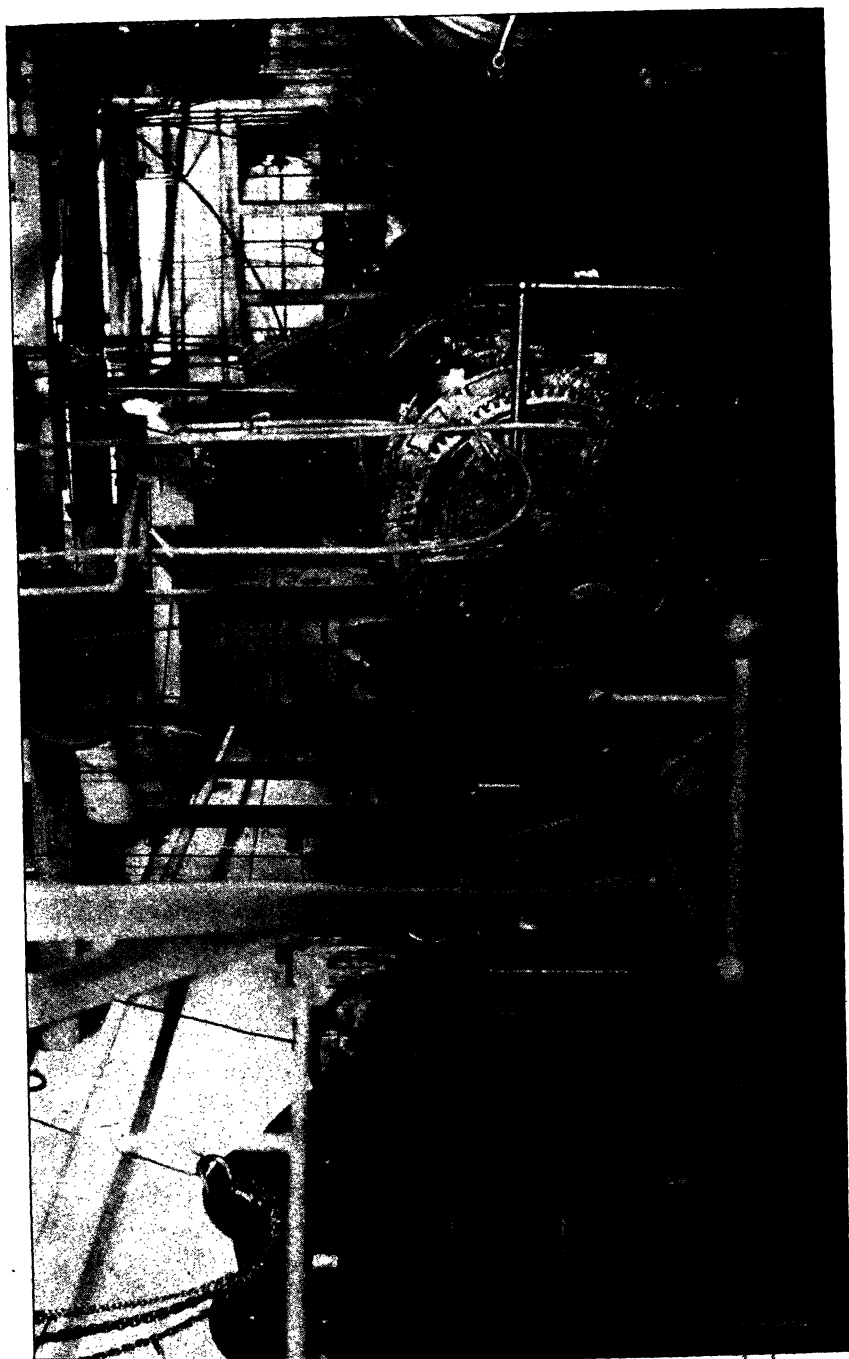
In many of the industrial establishments in the state, the conditions of work have been found to be excellent, the management giving proper regard to the health and comfort of the employees, and the organization being model in all respects. Everything in reason has been done for the workers, and a high standard of efficiency has been maintained.

Unfortunately, such model establishments and such enlightened employers are in the minority, as by far the greater number of employers have not yet awakened to the importance of improving conditions of labor. Investigations in a great number of factories throughout the state have revealed much that is deplorable. In the production of commodities, great economy must needs be practiced as a matter of course. But there is a tendency on the part of many employers to economize not only in matters of legitimate expense, but also in space, light, air and certain other safeguards to the health and lives of the workers. Such false economy inevitably injures the employer and imperils the health and lives of his employees. Workers exercise but little control, either individually or collectively, over conditions of labor in factories. The employer, alone, arranges all working conditions and regulates them according to his will.

The state has a direct interest in the health and lives of the workers. All factory legislation is founded upon the principle that the state regulates industries in order to safeguard the health of the workers. Improvement of working conditions and proposals for better protection of the workers cannot be achieved without



WIRE CABLE MANUFACTURING, BROOKLYN, N. Y.
Showing wire-drawing machines unprotected.—On the machine to the left, the operator was recently caught and wound around the drums, sustaining frightful injuries.



• WIRE CABLE MANUFACTURING, BROOKLYN, N. Y.
Showing imperfect guards around highly dangerous wire-rope machines.—Overcrowded conditions and narrow aisles.



a proper study of these conditions, and without a thorough inquiry into the best methods of state protection.

The investigations conducted during 1911 and 1912 by the New York State Factory Investigating Commission expressed the will and purpose of the Legislature to study working conditions "to the end that such remedial legislation might be enacted as would eliminate peril to the life and health of operatives and other occupants in existing or new structure, and to promote the best interests of the community."

INDUSTRIES INVESTIGATED.

The general sanitary investigation covered forty-five cities in the state; eighty-eight separate industries were represented; 3,176 separate industrial establishments, and 6,075 shops in which there were found working 189,335 persons. The statistical statement of the industries investigated may be seen in Table V.

TABLE NO. V.

	Industrial establishments.	Shops.	Wage-earners.
1. Clothing industry.....	341	523	28,221
2. Textiles.....	132	490	35,173
3. Metal industry.....	130	415	25,840
4. Foods.....	729	1,123	15,447
5. Furs.....	253	284	3,985
6. Chemical industry.....	127	344	4,704
7. Tobacco.....	251	472	15,594
8. Printing.....	348	523	9,047
9. Miscellaneous.....	865	1,901	51,264
	13,176	6,075	189,335

¹This does not include the 400 establishments inspected during December, 1912, in Rochester, N. Y.

Extended reports of the investigations in the chemical, tobacco and printing trades will be found in chapters 4, 5 and 6, respectively. In the following pages, only the general sanitary features of the investigation will be given, as they relate to the clothing, the textile, the metal, the food and the fur industries and the general sanitary condition in other industries.

1. *The Clothing Industry:*

The clothing industry is the most important industry in New York State, and New York State is the most important clothing center in the United States. According to the thirteenth U. S.

census, there are 11,058 establishments manufacturing clothing in the United States, with 394,269 employees. Of these, over one-half of the establishments — 6,066 (54.8%), with 189,467 employees (48.1%), are in New York State. Clothing manufacture is centered in the cities of New York, Rochester and Buffalo. Nearly one-third of all the clothing establishments in the state belong to the cloak, suit and skirt industry in New York City, where nearly 1,900 cloak and suit shops are located, employing over 51,000 persons.

The sanitary conditions of the cloak and suit shops in New York City have greatly improved within the last year or two, owing to the activities of the Joint Board of Sanitary Control. The work of the Board has been more fully described in testimony given at the Public Hearings of the Commission.

The sanitary conditions of the men's clothing shops are not first class, although they compare favorably with certain other industries. There are some very large clothing factories in New York city and Rochester which are model in every respect, and in which full protection is given to the health of the workers. The largest number of clothing shops, however, are located in loft buildings, with defective fire-protection, light and ventilation. In these shops cleanliness is often considered unnecessary. A very large part of the work on men's clothing is given out into the tenement houses where it is done under very bad sanitary conditions and environments.

Of the 341 clothing establishments inspected, 74.8% were located in loft buildings, 6.1% in converted tenements, and only 19.1% in special factories. Inadequate light was found in 28.7% of the shops; mechanical ventilation in only 10.3%. The inspectors reported cleanliness to be "poor" in 26.8% of the shops and in 13.2%, "very poor."

Over eighty clothing establishments were inspected in Rochester. Two establishments were found in perfect sanitary condition. Some defects were found in many of the other establishments. On the whole, sanitary conditions of the clothing plants in Rochester were fair.

2. *Textile Mills:*

One hundred and thirty-two textile mills have been inspected throughout the state. Most of these were cotton and wool manu-



FUR DRESSER, EAST FIFTY-FIRST STREET, NEW YORK CITY.
Tubbing Furs.—The furs are placed in barrels and covered with sawdust; the men tread the furs with their bare feet so as to make them soft and pliable; the work is very dusty and exhausting.



FUR DRESSER, EAST FIFTY-FIRST STREET, NEW YORK CITY.
Fleshing Room where surplus flesh is removed from under side of skins.—Very humid and foul-smelling.

factories located in the cities of central New York. A number of shoddy and other mills were included. The buildings in which the textiles are manufactured are usually of so-called "mill" construction. The construction is excellent as far as fire protection is concerned, and many of these mills belong to the New England Underwriters' Association.

The safeguarding of the machinery in mills leaves much to be desired. It is not uniform. Here and there the fly-wheels and transmission parts are properly guarded, and in the next aisle will stand a machine entirely devoid of any safeguards. The aisles between machines are very narrow. The light is dim in many places, especially towards the center of the room. Artificial light is often used during the day. The temperature is very high. The windows are kept closed, and the air conditions are bad. The humidity is excessive, owing to the artificial humidification of the air needed for the proper handling of the product. The floors are slippery. The girls in spinning rooms have a number of spinners to attend, and are generally "speeded up." The men attending the "mules" are often barefooted and scantily clothed. Few of the textile mills are provided with mechanical ventilation. The carding and preparing rooms are extremely dusty; the air is thick with dust and every employee is covered with it. The noise in all textile mills is very great.

The sanitary conveniences found in most of the textile mills are of a very crude type. Washing facilities are inadequate. Lunch rooms were found in less than half a dozen places, lunch being usually eaten within the factory. Seats for women are seldom provided, and when found are backless. No model textile mill has been discovered in the state, although there is hardly another industry which does not count a considerable number of model establishments.

3. *Metal Trade:*

One hundred and thirty establishments in this group, with 415 shops, employing 25,840 persons, were investigated. Some very fine modern shops were found in the trade. These were model in all respects, and prove the possibility and feasibility of perfect sanitary conditions in metal working plants.

The evils found in the majority of the metal shops are the following: unguarded machinery, lack of forced ventilation, and inadequate washing and toilet accommodations. It is rare to find a metal shop where all the machinery is properly guarded; consequently the accident list is very long. There is much dust in buffing, grinding, and polishing, yet there are comparatively few shops where there is a suction system for the removal of dust. Sand-blasting is still done in closed bins or basements, by ancient and crude methods, without any other protection to the workers than a cloth over the mouth and nose. The fumes from pouring-molds are allowed to disseminate in the air of shops, fume vents being found in but few plants. Temperatures are often very high, especially near the furnaces.

Women were found working in the core rooms in several foundries. The core rooms were not separated from the core ovens, and the heat and dust therein were excessive.

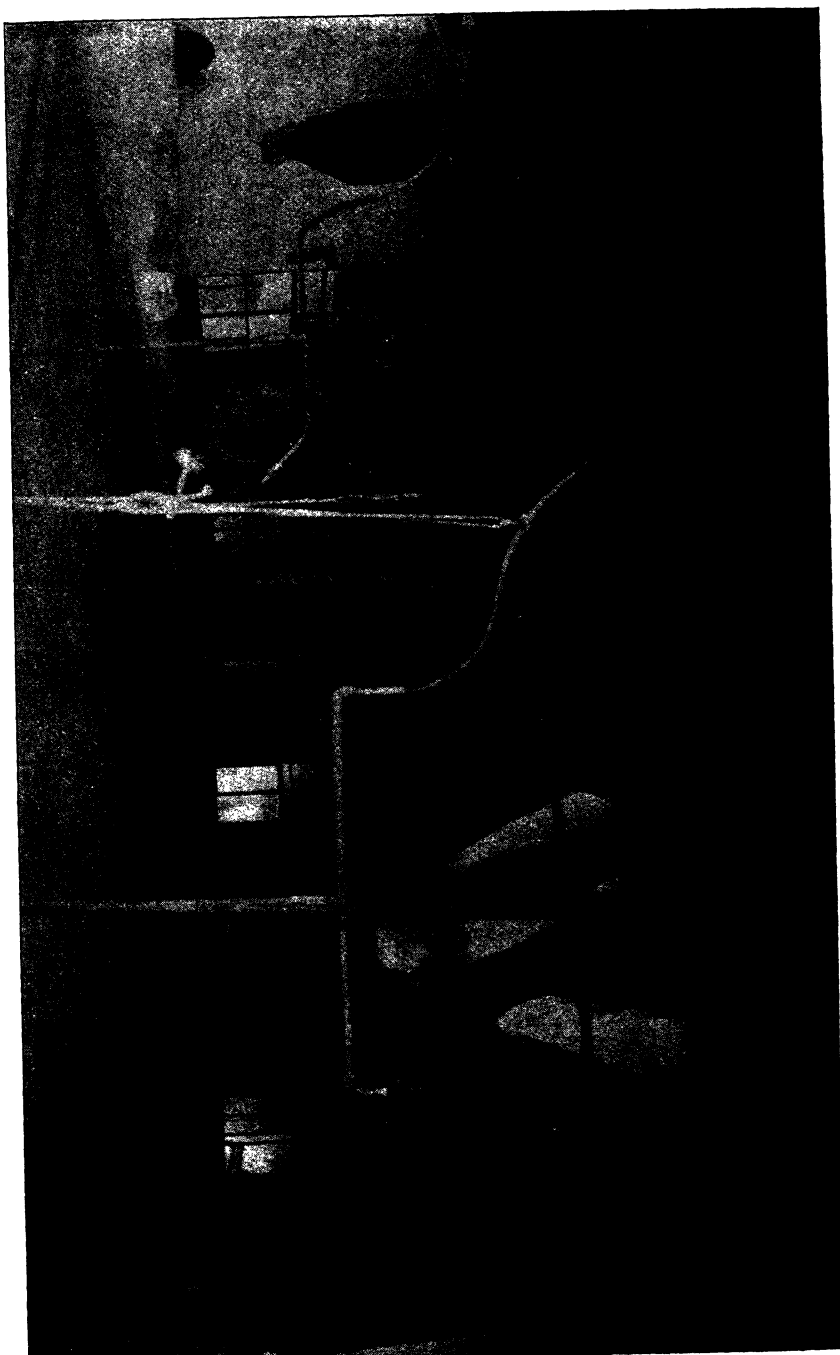
Hot water was provided in but few of the wash-basins, which were generally of a very old, crude type and located in many plants at a considerable distance from the workers. In some shops the only means provided for washing was an old barrel filled with dirty water.

Separate lunch rooms were found in but four establishments. The toilet accommodations were in many cases found outside the shops, located at some distance from the building. The workers, in an over-heated and perspiring state, are compelled to cross this distance in cold and inclement weather.

4. *Foodstuffs:*

Of the 726 establishments and 1,120 separate shops inspected, 593 were found in cellars and basements. Most of the establishments (75.4%) where foods are manufactured were located in tenement houses and converted dwellings.

A report on the conditions of bakeries in New York City, was made in 1912. Conditions in the bakeries have improved very little, nor will there ever be substantial improvement as long as they are permitted to remain underground. A number of food factories besides bakeries, notably confectioneries, ice cream factories, delicatessen and other meat manufactories were found in cellars.



CLOAK AND SUIT SHOP, WILLET STREET, NEW YORK.
Lighting conditions defective in this room; dangers from gas leakage.



In 75% of the food shops inspected, the investigators reported cleanliness to be "poor" and "very poor;" and in 60.7%, the light was inadequate.

Windows and doors, properly screened, were found in comparatively few of the food-cellars, with the result that flies are thick in those places. This condition was noticed even in the better class of establishments built above ground. In a very large cheese and dairy-products factory in the middle of the state which I inspected during the summer, I found all the cheese exposed on tables, and literally covered with flies. The superintendent who accompanied me in my inspection did not see anything improper in this condition when his attention was drawn to it.

The remedies recommended in my former report on bakeries are again urged as the only solution of the problem of keeping the manufacture of our food-stuffs in a sanitary condition, and preventing such manufacture from becoming a menace to the public and to the workers.

5. *Fur Shops:*

Our inspectors visited 253 establishments in New York City with 284 separate shops. Most of the fur shops do work on a small scale, employing from three to ten persons. There are but very few in which more than a hundred workers are to be found. The majority of the fur shops are located either in the cheaper loft buildings of older construction, or in converted tenement and dwelling houses.

The sanitary conditions in most of the fur shops are deplorable. The ventilation is very bad, the windows as a rule being kept tightly closed, and no mechanical means of ventilation provided. The temperatures are high. The cleanliness of these places leaves much to be desired.

There are special dangers to the workers in this trade from the fine dust and particles of fur flying in the air. Furriers often suffer from asthma (furrier's asthma), and from a catarrh (rhinitis), affecting the nose and upper air passages. A physical examination of a limited number of fur workers was made in 1911.

Table No. VI shows the physical condition of the eighty-three furriers examined in 1911.

TABLE NO. VI.
PHYSICAL CONDITION OF THE EIGHTY-THREE FURRIERS EXAMINED.

	Number.	Per Cent.
Total number of furriers examined.....	83	100.0
Number in normal condition, i. e., free from any disease or deformity noted below.....	9	10.8
Number with one or more diseases noted below.....	74	89.2
Phthisis.....	5	6.0
Rheumatism.....	6	7.2
Nose.....	42	50.6
Heart.....	5	6.0
Bronchitis.....	25	30.1
Asthma.....	11	13.3
Pharynx.....	13	15.7
Tonsillitis.....	3	3.6
Skin.....	21	25.3
All others.....	12	14.4
Total number of cases.....	143	.....
Ages—16 years to 44 years.....	81	97.6
45 years and over.....	2	2.4
Sex—Males.....	78	94.0
Females.....	5	6.0
Length of time in trade:		
1 year to 5 years.....	43	51.8
6 years and over.....	40	48.2

Of the eighty-three examined, one was American born.

While the number examined is insufficient for general conclusions, the result confirms former investigations made by others, and justifies the statement that this is a dangerous trade.

INDUSTRIAL CONDITIONS.

CONDITIONS WHICH WERE NOT INVESTIGATED.

No special inquiry was made by the Commission as to certain economic conditions of industry, such as unemployment, wages, hours of labor, Sunday work, continuous work, safeguarding of machinery, accidents, etc.

The subjects of unemployment, wages and hours of labor are regularly inquired into by the Bureau of Statistics. Our investigators made a number of inquiries as to the rate of wages, and hours of labor, but this data was not sufficient nor extensive enough to be recorded. In the Cannery, Mercantile and Homework Investigations, however, a more thorough investigation of wages and hours of labor has been made.

There was no general investigation of continuous work, night shifts and Sunday work, except as noted in the various special industries, and in the special reports on Night Work of Women.



HAT MANUFACTURING COMPANY, YONKERS, N. Y.

Scalding room where beaver hats are treated; room constantly filled with hot vapors; excessively hot, humid and dirty.



HAT MANUFACTURING COMPANY, YONKERS, N. Y.
Beating-up machines.—The workmen are constantly splashed with very hot water; humidity intense; no proper exhaust



The investigation of the causes of accidents, and the proper safeguarding of machinery was a subject of special inquiry by the Wainwright Commission, and was not directly investigated by this Commission.

The investigation of fire protection in loft and special buildings has been carried on by special experts, not under my direction, and is separately reported.

An inquiry into certain trades where excessive dust, gases, fumes and industrial poisons abound was made and special reports have been written on these conditions.

CONDITIONS INVESTIGATED.

In our general sanitary investigation, special attention was given the following subjects:

- (A) Factory Location and Construction.
- (B) Light and Illumination.
- (C) Ventilation.
- (D) Washing Facilities.
- (E) Lunch Rooms.
- (F) Toilet Accommodations.
- (G) Sanitary Care and Comforts.

(A) LOCATION AND CONSTRUCTION OF FACTORIES:

The location of a factory and its construction and general character are all of great importance to the employers, to the workers and to the general public of the city where the factory is located. There is at present little legislation upon the subject of location and construction of industrial establishments. Factory location is not under state or municipal supervision.

There are two main classes of factories: first, those located in lofts: and second, those located in special factory buildings. The first class predominates in New York city, largely in the Borough of Manhattan; the other class predominates outside of New York city.

The following industries are largely located in lofts:

Clothing	74.8 per cent.
Furs	58.9 per cent.
Printing	57.5 per cent.

Paper boxes and paper bags.....	54.3 per cent.
Tobacco	52.6 per cent.
Flowers and feathers	52.0 per cent.

The following industries are largely located in special factory buildings:

Gloves	90.9 per cent.
Textiles	84.0 per cent.
Chemicals, paints and illuminants.....	83.5 per cent.
Woodwork	82.0 per cent.
Stone, glass and clay establishments.....	78.9 per cent.
Hats and caps	65.7 per cent.

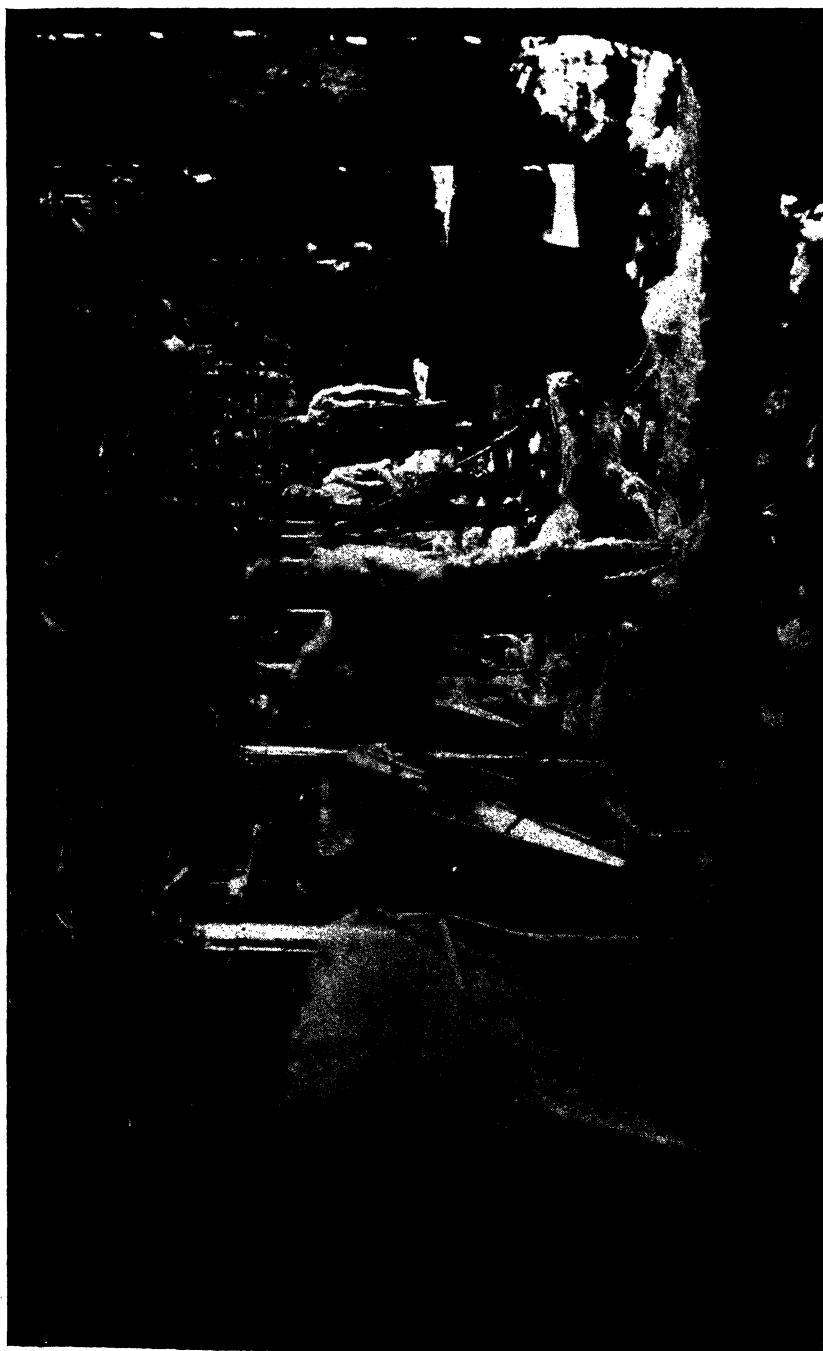
Table No. VII shows the type of buildings investigated in 1911 and 1912 (containing 2,543 establishments), classified according to industries.

TABLE NO. VII.

TABLE SHOWING THE TYPE OF BUILDINGS INVESTIGATED¹ IN 1911 AND 1912, CLASSIFIED ACCORDING TO INDUSTRIES.

INDUSTRIES.	Total Number of estab- lish- ments.	SPECIAL FACTORY.		LOFT.		CONVERTED.		UNKNOWN	
		No.	Per Cent.	No.	Per Cent.	No.	Per Cent.	No.	Per Cent.
Clothing.....	341	65	19.1	255	74.8	21	6.1	..	...
Chemicals, paints and illumi- nants.....	127	106	83.5	16	12.6	4	3.1	1	0.8
Foodstuffs:									
Bread and other bakery products.....	42	13	30.9	4	9.5	25	59.6	..	...
Candy.....	69	37	53.6	14	20.3	17	24.7	1	1.4
Ice cream.....	17	3	17.7	3	17.6	11	64.7	..	...
Mineral water.....	84	19	22.7	10	11.9	55	65.4	..	...
Sausages and meat packing	73	30	41.1	8	11.0	35	47.9	..	...
Miscellaneous.....	24	18	75.0	6	25.0	..	..	..	...
Flowers and feathers.....	94	3	3.0	49	52.0	42	45.0	..	...
Furs.....	253	5	2.0	149	58.9	99	39.1	..	...
Gloves.....	33	30	90.9	2	6.1	1	3.0	..	...
Hats and caps.....	32	21	65.7	5	15.6	5	15.6	1	3.1
Human hair.....	67	..	..	20	30.0	47	70.0	..	...
Laundries.....	124	41	33.1	40	32.3	34	27.4	9	7.2
Leather and rubber goods...	41	32	78.1	8	19.5	..	..	1	2.4
Metals.....	130	103	79.3	25	19.2	2	1.5	..	...
Paper boxes and paper prod- ucts.....	92	37	40.2	50	54.3	3	3.3	2	2.2
Printing.....	348	33	9.5	200	57.5	115	33.0	..	...
Stone, glass and clay.....	19	15	78.9	4	21.1	..	..	..	...
Textiles.....	132	111	84.0	19	14.4	1	0.8	1	0.8
Tobacco.....	251	49	19.5	132	52.6	70	27.9	..	...
Woodwork.....	28	23	82.1	5	17.9	..	..	..	...
Miscellaneous.....	122	73	59.9	33	27.0	15	12.3	1	0.8
Total.....	2,543	867	34.1	1,057	41.6	602	23.7	17	0.6

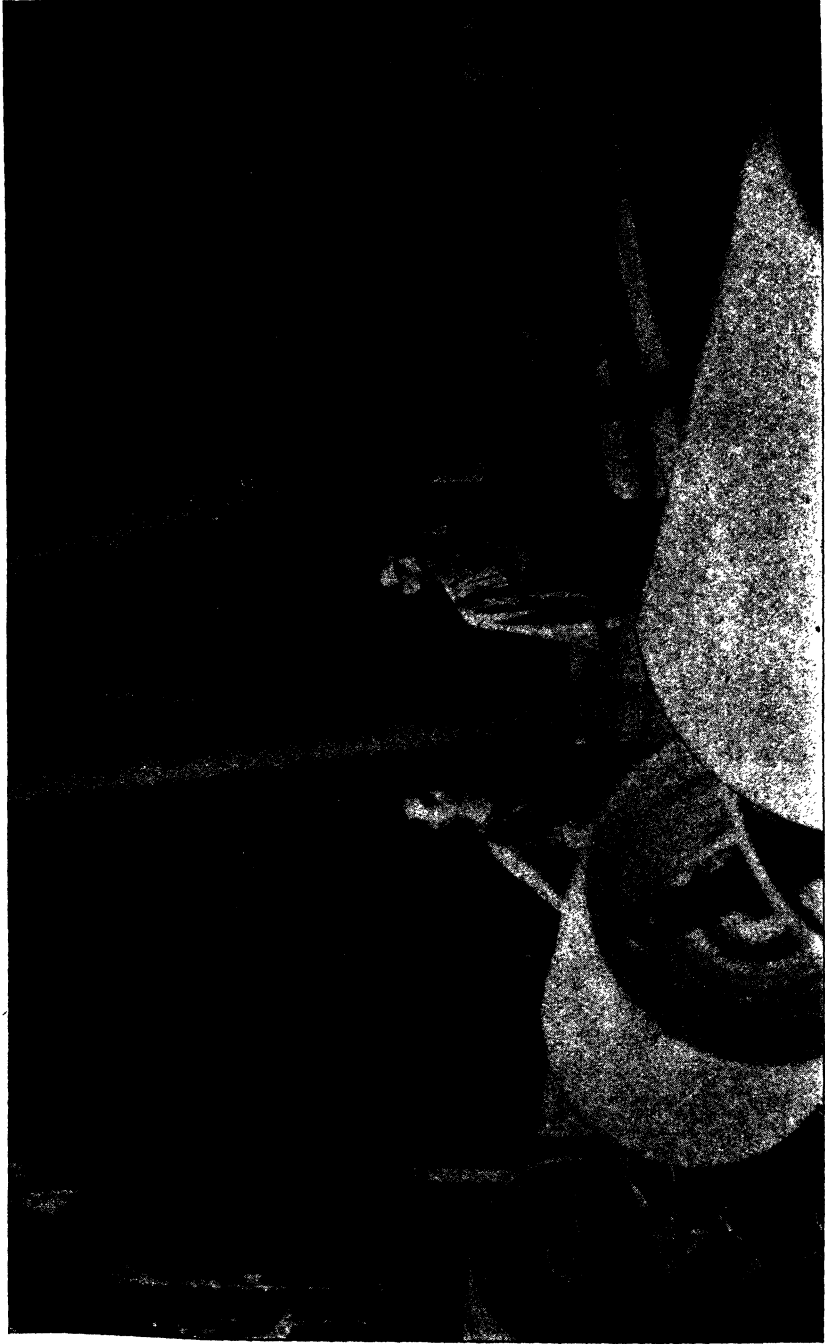
¹ The 495 bake shops inspected in 1911 are not included in this table. Neither are the miscellaneous trades included which were inspected by the Bureau of Social Research.



KNITTING MILLS, HUDSON, N. Y.

Carding Room.—Owing to the absence of ducts and hoods, the whole room is filled with floss that it is difficult to see.





KNITTING MILLS, HUDSON, N. Y.
Drying Room.— This room is located in the cellar, and owing to inadequate ventilation the temperature ranges between 120 and 130 degrees

The problem of the loft buildings is one peculiar to the Borough of Manhattan in New York City. Here during the last decade, within a mile north and south of Twenty-third street, there has been constructed a very large number of ten to twenty-story buildings. These buildings house various industrial establishments, chiefly those belonging to the garment trade. The industrial congestion resulting from the erection of these "lofts" in the middle of Manhattan Island is the cause of defective fire protection and insufficient provision for the sanitary care and comfort of the thousands and tens of thousands of workers who must be crowded in the narrow structures.

The proper lighting of such buildings presents very great difficulties, as also their ventilation. The sanitary necessities for the employees in the loft buildings and shops are inadequate for the reason that the builders of the loft structures do not know the number of persons who are destined to work in the individual shops thereof. The conditions, therefore, under which manufacture is carried on in the loft buildings of Manhattan Island differ considerably from those which exist in the special factory buildings throughout the state.

In many loft buildings of modern construction, the conditions as to light, ventilation and sanitation are adequate, but the fire hazard is especially grave, whereas in the majority of factory buildings of early construction throughout the state, there are practically no modern conveniences, but the fire hazard is comparatively negligible.

Of the many remedies proposed for the cure of the existent evils in loft industries, the most important are:

- (1) The limitation of the occupancy according to the character and number of building exits.
- (2) The installation of mechanical ventilating plants.
- (3) A licensing system for all establishments located in such buildings.

A decentralization of the loft zone by a restriction of the height of buildings, and a limitation of their occupancy for industrial purposes is also advised.

The construction of special factory buildings throughout the state differs very largely. There are all sorts and conditions of

factories, from the ancient ramshackle, "lean-to" frame to the splendid, modern high-class, reinforced concrete buildings. But whether ramshackle, "lean-to" or modern concrete structures, the construction is at present under no supervision by the state. The architects who make the plans for the buildings, give but little consideration, as a rule, to the health and safety of the workers.

I have but recently inspected a newly constructed building intended for the extension of a large chemical plant in Brooklyn. In this plant there was a total absence of any provision for washing facilities and toilets. The foreman told me that they did not think these were necessary in the new buildings, as the old ones were equipped with them.

I should recommend that the State Department of Labor have supervision of plans for factory construction in so far as they relate to fire protection, light, ventilation and other sanitary conditions; and that all such plans for new buildings should be submitted to the Department for approval in order to ensure proper sanitation in new factory buildings.

A number of industrial establishments are located under-ground, in cellars and basements. Attention has been drawn to this matter in my report on "Bakeries and Bakers" published in the preliminary report of the Commission. The inspectors found a number of establishments located in cellars and in basements; food products were manufactured or sold in the majority of such establishments. As has been pointed out before, cellars and basements are unfit for use as industrial establishments, and should be eliminated from industry.

In a number of countries abroad, factory construction is in certain particulars under government control.

In *Germany*, the points which are under regulation by the Berlin Building Police are the following: size of lot; size of building; character of industry for which a building is constructed; distance from other factories; ratio of window space; fire protection; light and ventilation.

The space is regulated according to the zone of location. The maximum of height is fixed. A fire wall must be provided for every forty meters of floor length. In *Braunschweig* only 75% of the lot may be built upon.





HAT MANUFACTURING COMPANY, YONKERS, N. Y.
First process in felt hat making; excessive heat and humidity prevails.—Flooring defective and dangerous.

In *Switzerland* cellars cannot be used for workshops except by special licenses. Height and cubic air space of workshops are definitely provided for. Windows must be at least 1.8 meters in height, and the distance from the floor cannot be more than thirty cm.

In *France* all plans for building construction in the dangerous trades must be submitted to the Prefect of the Department in which the building is to be erected.

(B) LIGHT AND ILLUMINATION.

The lack of proper lighting in our industrial establishments has been recognized as a serious evil by sanitarians, efficiency engineers and factory inspectors. The lack of proper lighting in American factories has been commented upon by many foreign travelers. Arthur Shadwell in his book on "Industrial Efficiency" (page 3) says: "In the United States I have seen so many mills and other works miserably lighted," and again: "A bad light is the most conspicuous and general defect of American factory premises." He claims that Germany and England are vastly more advanced in this respect than America.

The full importance of adequate and proper light in factories has been recognized in the legislative enactments abroad as well as in the United States, although here the legislation on this subject is very general.

It is universally admitted that inadequate lighting of industrial establishments affects not only the eyesight and general health of the employees, and the efficiency of their work, but is also responsible for the number and the frequency of accidents. There are, however, as yet, no scientific standards to determine what "adequate," "sufficient" and "proper" lighting of factories should be.

There are a number of factors which enter into the problem of the proper lighting of factories. Some of these are: location of building, height, surrounding buildings, size of workrooms, size and placing of windows, ratio of window space to wall space, kind of glass surface, color of wall, ceiling and floor surfaces, etc., etc.

The demands of the proper lighting of industrial establishments must be adapted, of course, to the requirements of the

particular industry, the kinds of machinery, the color of materials, etc., in use. There is urgent need for a more thorough inquiry into the subject of industrial illumination. An admirable report on this subject by Mr. D. R. Wilson is found in the Annual Report of the Chief Inspector of Factories and Workshops of Great Britain, for the year 1911.

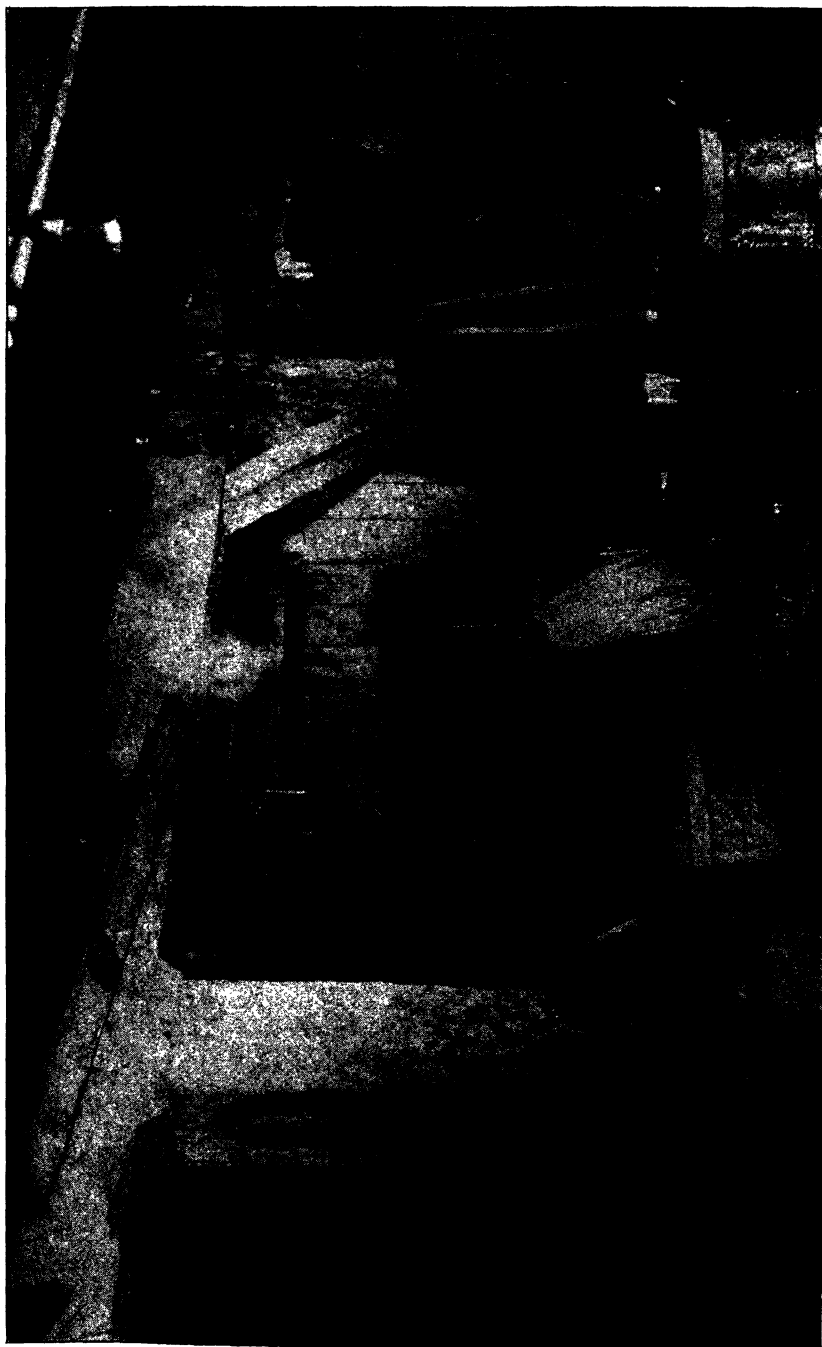
According to the evidence presented in the accompanying table, buildings representing a large number of industries were inadequately lighted; the chemical industry being the highest, with a percentage of 64.8, followed by the ice cream plant with a percentage of 50 per cent; printing, 48.4 per cent; candy, 49.2 per cent, and laundries, 36.7 per cent.

Table No. IX shows manufacturing establishments in selected industries, classified according to light and ventilation.

TABLE NO. VIII
SHOPS OF MANUFACTURING ESTABLISHMENTS IN SELECTED INDUSTRIES CLASSIFIED ACCORDING TO LIGHT AND VENTILATION, 1911-1912.

INDUSTRIES.	Total Number of Shops.	INADEQUATE LIGHT IN SHOP.		SHOPS USING			
				MECHANICAL VENTILATING.		SPECIAL DEVICES.	
		Number	Per Cent.	Number	Per Cent.	Number	Per Cent.
Clothing.....	523	150	28.7	54	10.3	102	18.5
Chemicals, paints and illuminants.....	344	223	64.8	37	10.8	110	32.0
<i>Foodstuffs:</i>							
Bread and other bakery products.....	61	8	13.1	13	21.3	8	13.1
Candy.....	197	97	49.2	12	6.1	22	11.2
Ice cream.....	20	10	50.0	.....	.....	.....	.....
Mineral water.....	112	45	40.2	.....	.....	3	2.7
Sausages and meat packing.....	130	31	23.8	4	3.1	14	10.8
Miscellaneous.....	103	46	44.6	16	15.5	7	6.8
Artificial flowers and Feathers.....	120	20	16.7	7	5.8	3	2.5
Furs.....	284	4	1.4	10	3.5	11	3.9
Gloves.....	80	.....	.....	8	10.0	19	23.8
Hats and caps.....	81	1	1.2	4	5.0	20	24.7
Human hair.....	131	25	19.1	.....	.....	.....	.....
Laundries.....	281	103	36.7	122	43.4	101	35.9
Leather and rubber goods	135	10	7.4	37	27.4	22	16.3
Metal.....	415	55	13.2	75	18.1	54	13.0
Paper boxes and paper products.....	220	41	18.6	29	13.2	18	8.2
Printing.....	523	253	48.4	32	6.1	73	14.0
Stone, glass and clay.....	60	17	28.3	8	13.3	4	6.7
Textiles.....	490	50	10.2	43	8.8	57	11.6
Tobacco.....	472	35	7.4	62	13.1	69	14.6
Woodwork.....	76	6	7.9	19	25.0	7	9.2
Miscellaneous.....	266	28	10.5	55	20.7	29	10.9
	5,124	1,258	24.5	604	11.8	696	13.6

¹ Light of shops not specified in the following industries: Clothing, 7; chemicals, 2; bread, 6; mineral water, 3; meat, 11; gloves, 2; laundries, 1; leather and rubber goods, 6; metal, 18; printing, 5; textiles, 8; woodwork, 6; miscellaneous, 10. 4 4 4



SAUSAGE CASINGS, WEST FORTY-FIRST STREET, NEW YORK CITY.

• Preparing sausage casings in a cellar on the river's edge.— This room is excessively hot, humid and foul-smelling.



My own impression after a visit to several hundred establishments throughout the state, is that very little attention is paid to this matter by employers and builders, and that a large number of industrial establishments use artificial light during daytime because of inadequate provision for day light.

As to artificial illumination, the character of illumination has been found adequate in most establishments, although little attention is paid to the quality of the illumination. Intensity, location and the prevention of glare are subjects that are generally neglected. The quality of artificial illumination in shops depends largely upon the source of the light, its character, its intensity, kind of fixture, position of fixture, freedom from glare, adjustment with respect to the workers, etc. Unfortunately very little attention is paid to these matters except in a very few establishments.

The installation of an illuminating plant for an industrial establishment should be under the supervision of an illuminating engineer, and should be under the direction of the Department of Labor.

The provision for light and illumination in other countries are as follows: (a)

In *Belgium*, the wording of the royal decree of March 30, 1905, relating to the health and safety of workers in industrial undertakings as specified in the law of December 24, 1903, is as follows:

"Art. 7. The artificial lighting shall provide a constant and sufficient degree of illumination. Suitable measures must be taken to insure that the means of illumination do not unduly heat or vitiate the air in the premises.

Art. 9. Workmen must be protected against excessive radiation from the illuminating apparatus."

In *Holland*, the royal decree of January 3, 1897, relating to the condition of working of female and young employees under unhealthy or dangerous conditions, does not allow the person protected to be employed on premises where, between nine in the morning and three in the afternoon, artificial means have to be resorted to in order to secure sufficient illumination (save only in exceptional cases when the condition of the atmosphere renders artificial light essential). Moreover, the intensity of illumination must conform with certain definite requirements. In the case of the following trades: embroidery, working in precious stones, gold and silver, engraving metals or wood, the manufacture of instruments, printing, mechanical knitting and quilting, sewing, draughtsmanship, the repairing of clocks and watches, an intensity of at least fifteen bougie-meters is prescribed. In the case of

(a) *Resumé Legislative Enactments on Light*. E. Leavenworth Elliott, page 7.

other works requiring good lighting, an intensity of ten bougie-meters is necessary.

In *Austria*, the regulations of the Minister of Commerce, dated November 23, 1905, and applying to industrial licensed premises, contain the following passage, under the title "Natural and Artificial Illumination:—"

"12. The windows and skylights in workshops and factories must be so designed as to furnish adequate illumination for the purpose of facilitating the work executed by the light they furnish."

In *Germany*, in the special case of printing works and factories for the casting of type, we observe in the regulation prescribed July 31, 1897, the following remarks:

"1. The floor of such factories must not be less than one meter below the ground level. Exception may, however, be authorized by the authorities, provided special appropriate provision is made for hygienic ventilation and lighting. . . .

3. The rooms must be furnished with windows in sufficient number and of sufficient area to illuminate the premises satisfactorily. . . .

12. Illuminating apparatus capable of giving rise to production of a considerable amount of heat must be provided with means of protection in such a way as to avoid excessive heating of the workshop."

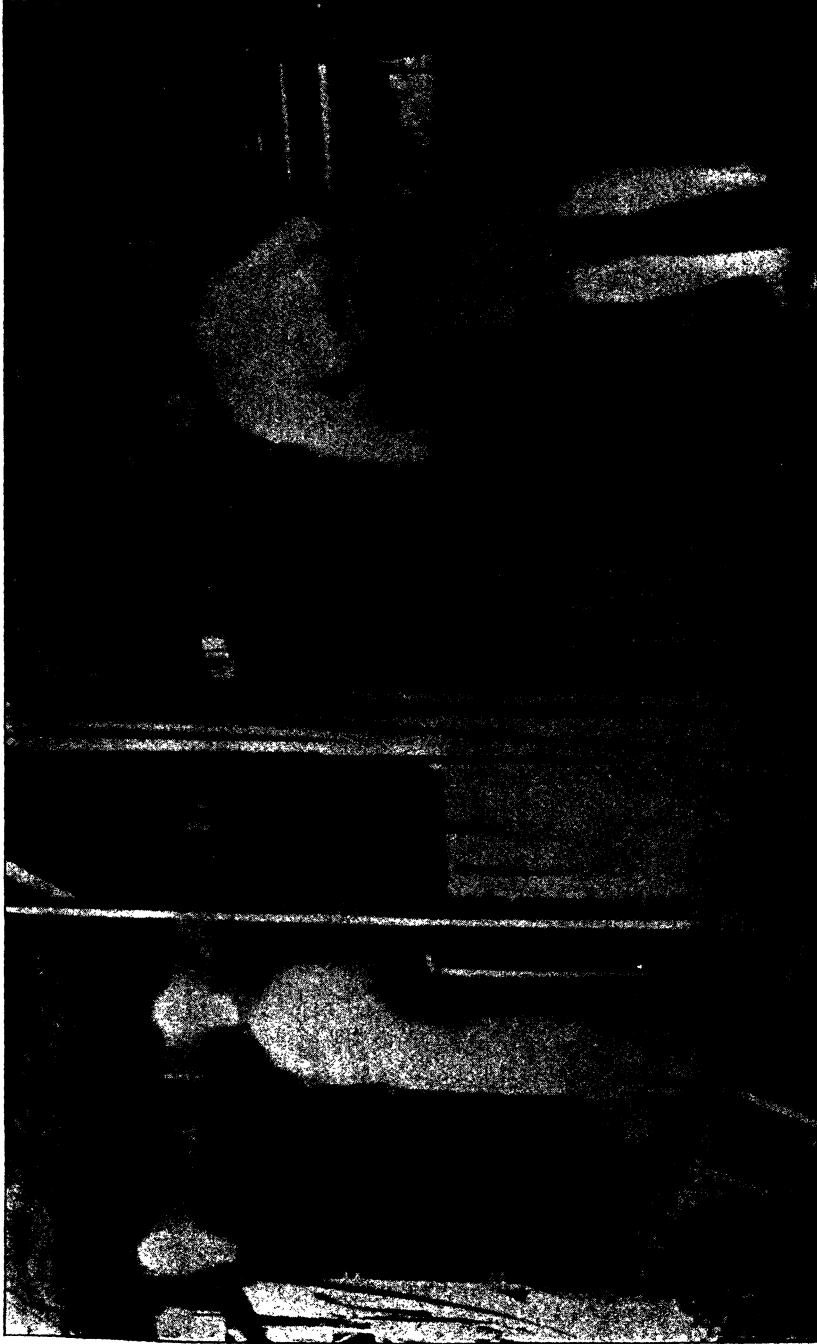
In *Switzerland*, the regulations issued by the Federal Council in December, 1897, contain the following directions as to re-building of factories. . . .

"C. The windows shall be at least 1.80 m. in height, and their distance from the ceiling shall not exceed 30 centimeters."

(C) VENTILATION:

Ventilation is the corner stone of sanitation. There is no condition of life in industrial establishments of such far reaching importance as the proper ventilation of the factories. In a large number of shops inspected the air was close, the shops were overcrowded, bad odors were often noticeable, temperatures were frequently high, humidity excessive, dust abundant, and gases and fumes quite oppressive.

No attention whatsoever, as a rule, is paid by those who construct factory buildings or by the employers of individual establishments to the subject of ventilation. The opinion seems to prevail that a change of air in the place should come by itself without human aid or mechanical means, and that no special provisions need be made for ventilating industrial establishments. According to the table presented herewith, it may be gathered that most shops rely solely upon window ventilation. That window ventilation is inadequate, and practically useless in the majority of cases, goes without question. During the summer when the temperature inside of the shops and outside are about equal, there is very



SUGAR REFINERY, BROOKLYN, N. Y.

The bag washing room, where the men work nude as they claim for comfort's sake.—Their nakedness was partially covered while picture was being taken; the heat and humidity in this room are intense.



little change of air through window openings. During the winter, windows are as a rule tightly shut to prevent draughts, and to prevent complaints from those workers who are situated near them. In industrial establishments, not only does the air contain a great many impurities due to the materials of the work and the various processes carried on, but the workers need a larger quantity of air due to their muscular exertions and increased activity. The problem of ventilation therefore in industrial establishments is very grave, and cannot be solved by additional opening of windows or even by such special devices such as have been put in in 15.5% of the shops investigated. The special devices consist of draught boards in the windows, "elbow" ventilators and various contrivances commonly used to give a false assurance of an adequate change of air. As almost all factories use steam and electric power for mechanical purposes, the installation of mechanical ventilation would not be very difficult.

Of the 5,124 shops investigated, only 604 or 11.8% were provided with some system of mechanical ventilation, and this was not always in good order or properly used.

Certain of the dusty trades and those where there is danger of various poisonous dusts, gases and fumes, had the smallest percentage of establishments which provided for mechanical ventilation.

The industries in which the worst conditions prevail as to ventilation come under the following heads: chemical, textile, printing, tobacco, artificial flowers and feathers, human hair. In these industries, there is a very large amount of dust, and in some of them, as in the printing, there is also a certain percentage of lead dust in the air. In some of the sugar refineries, and hat and cap factories, the conditions as to temperature and humidity were very bad, temperatures ranging from eighty degrees to ninety-six degrees, and humidity between seventy-five degrees and ninety degrees. Such conditions are very dangerous to the health of the operatives.

It is impossible to set one standard of ventilation for all industrial establishments, as the factors in each industry vary greatly. It is necessary to study each industry and each industrial establishment separately in order to determine the requisite amount of air and ventilation for each establishment or part of it.

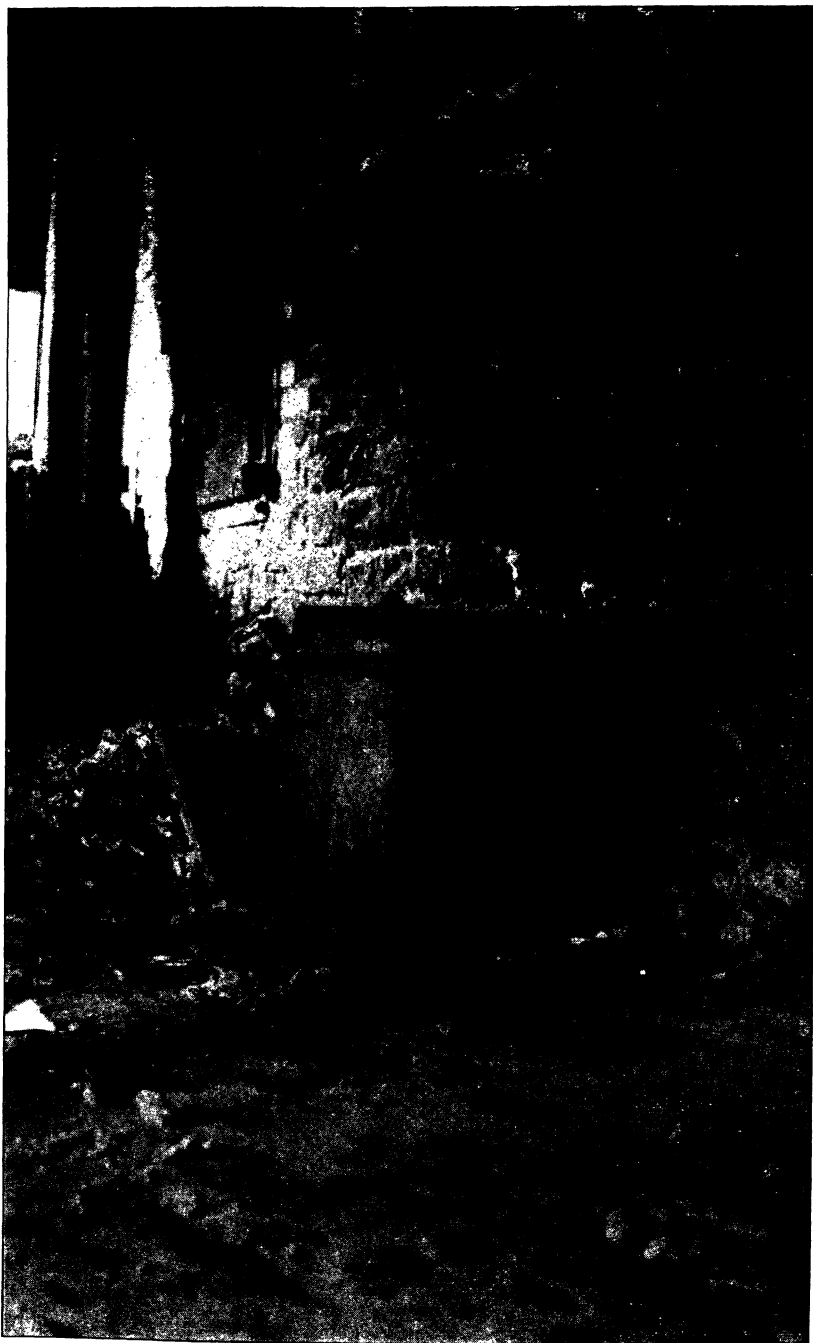
This work of research and investigation is properly within the sphere of the Department of Labor. The Commissioner of Labor should be given the power to make special rules and regulations as to ventilation in various establishments, after a proper and exhaustive study of each establishment.

(D) WASHING FACILITIES.

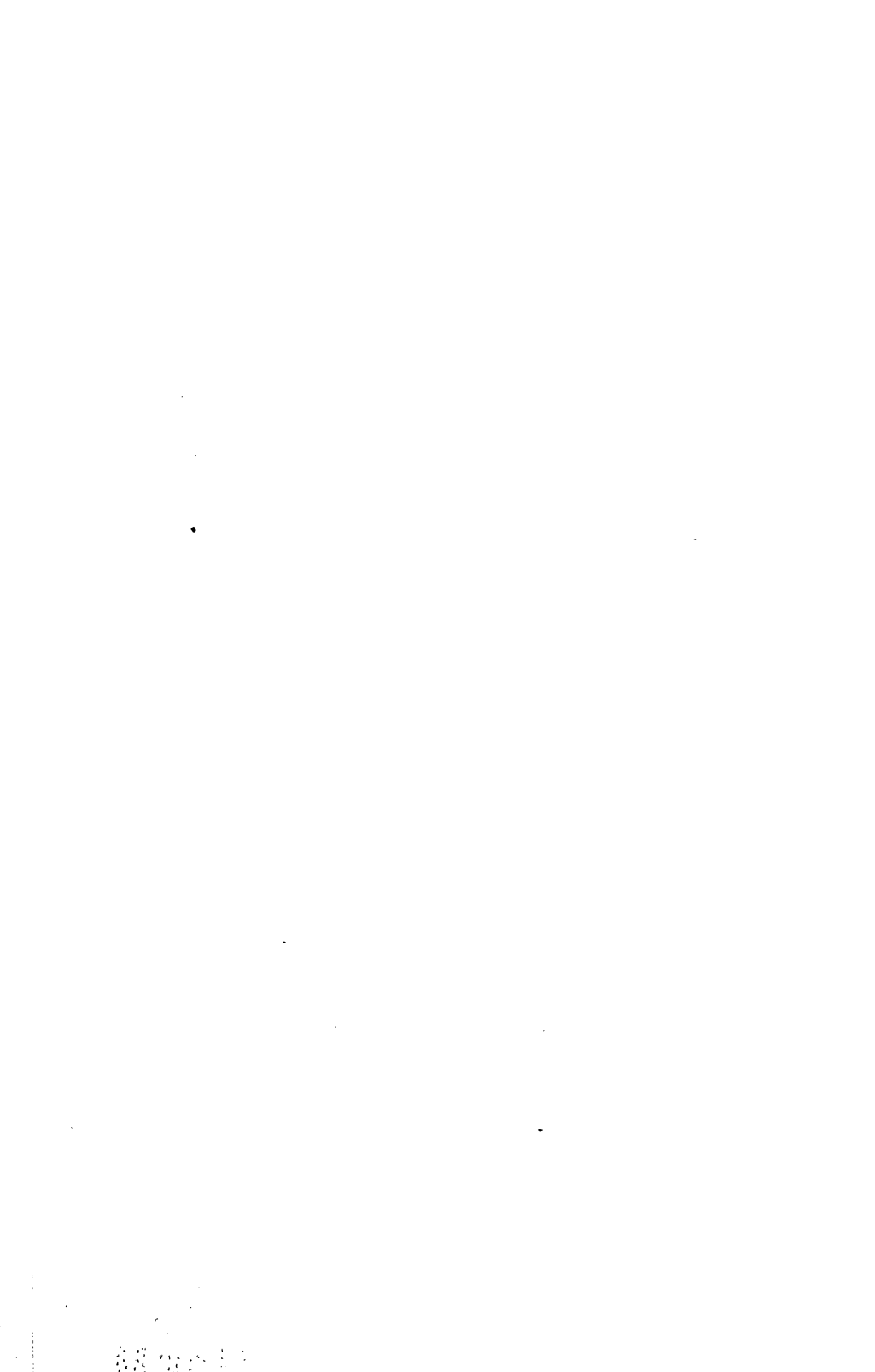
Our inspectors have found in 71.8% of the shops the washing facilities adequate, although the number of establishments providing hot water for the employees is still inconsiderable. The location of the washrooms and basins is not always within the easy reach of most of the employees. In a large number of establishments, the washing facilities are located in one central building, and it requires considerable time for the employees to reach these washrooms. Only a small number of establishments provide towels.

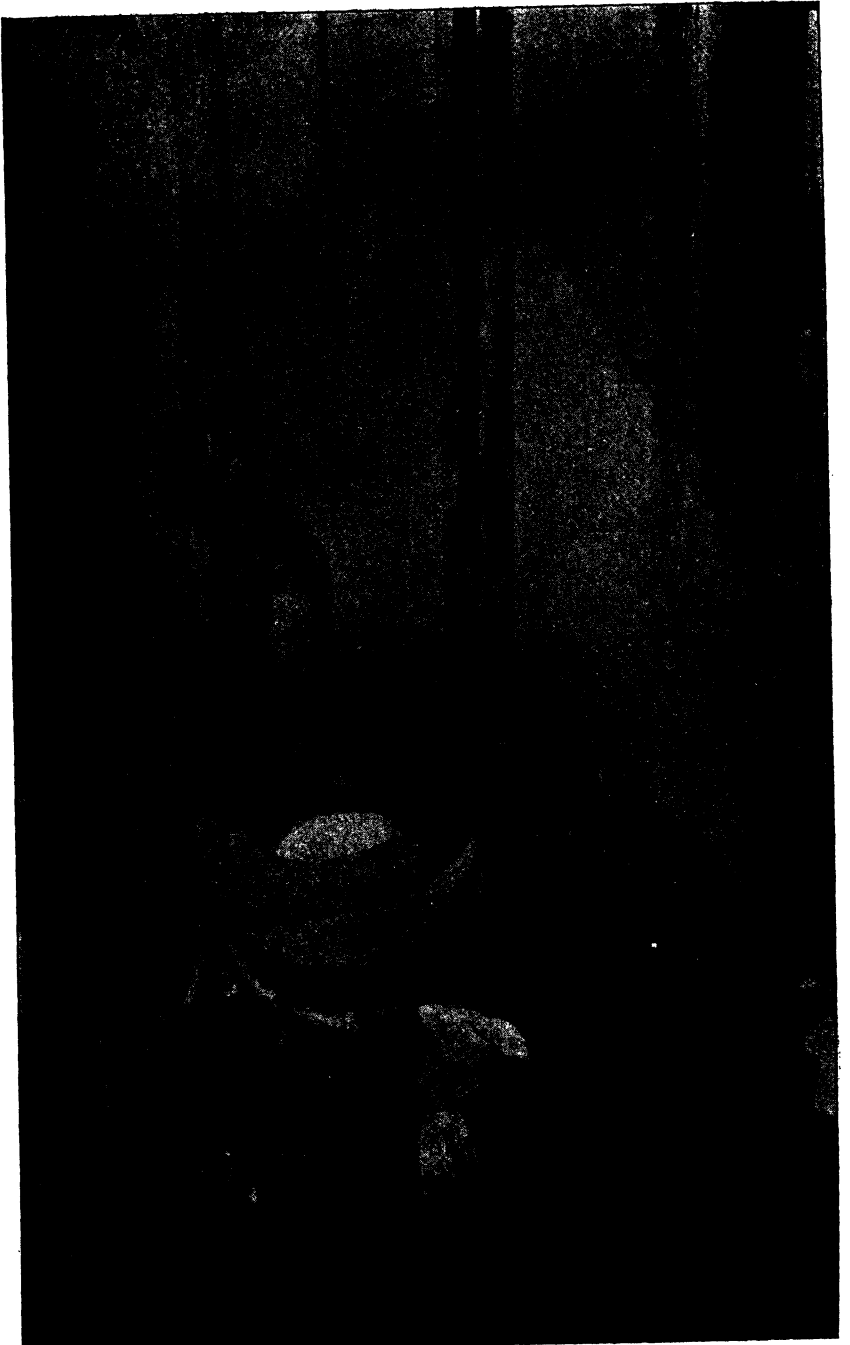
The worst feature in most of the industrial establishments, however, is the lack of proper supervision of the working force as far as washing facilities are concerned. There is hardly any factory where the washing-up at noon hour or after work is made compulsory, or is supervised by foremen. Until such supervision is introduced, it is hopeless to expect a thorough cleansing by the employees.

One of the reasons why plumbism is being eliminated in the Pullman car shops at Pullman, Illinois, is the stringent lavatory supervision at the noon hour. Ten minutes before noon hour the bell is rung, and all employees are compelled to go to the central washrooms, where they are furnished with individual nail brushes, soap and towels, and where they spend five to ten minutes in the process of washing, this process being supervised by foremen. I was not surprised to learn that since the introduction of this "washing-up" system the number of persons suffering from lead poisoning in the Pullman Company has been reduced from seventy-seven (77) in July, 1911, to none in July, 1912. The mere provision of wash basins and water is not sufficient to insure a proper cleansing of the hands which is so necessary to the preservation of the employees in certain trades, but supervision is required.

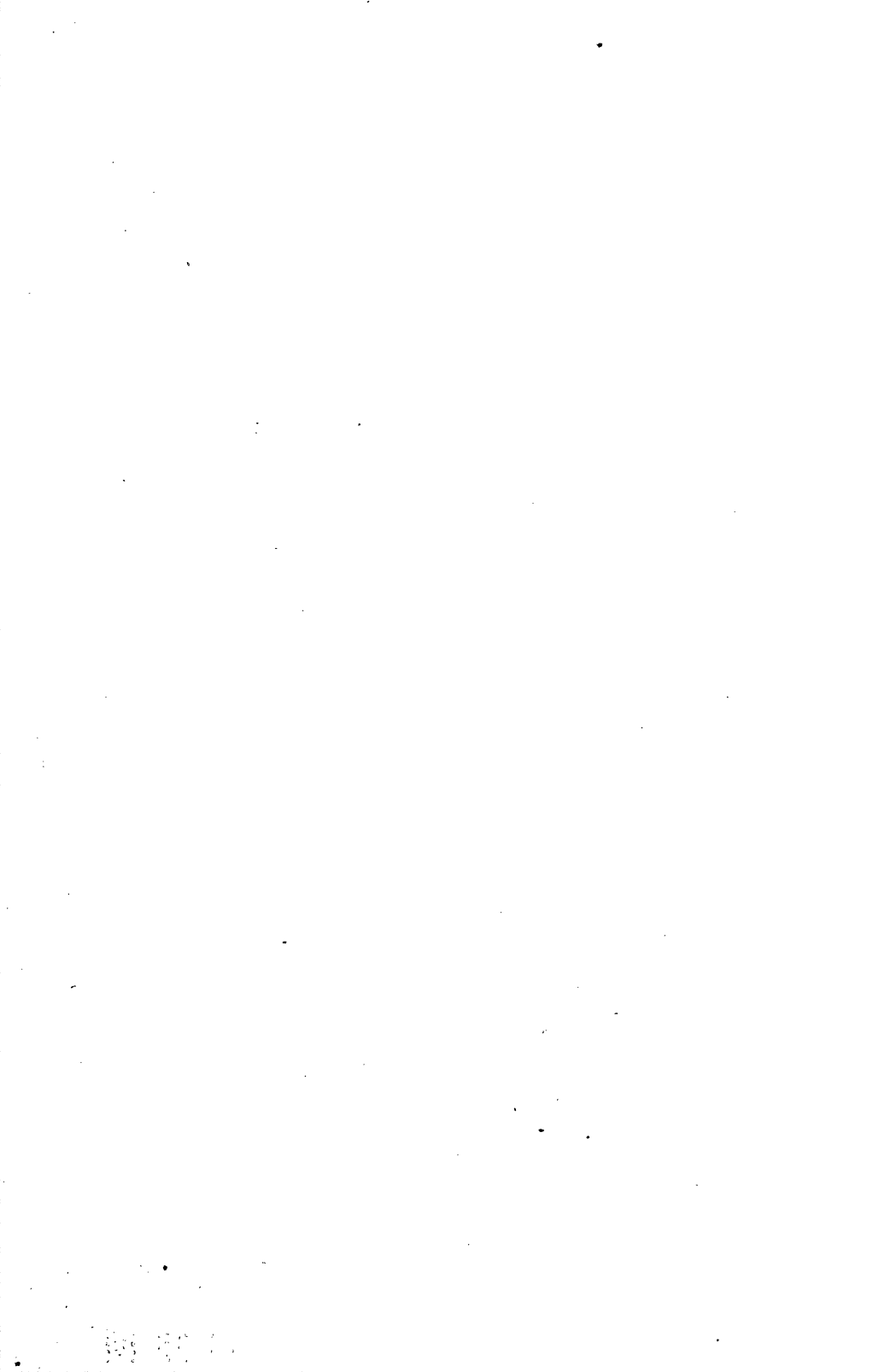


SHODDY FACTORY, LITTLE FALLS, N. Y.
Only toilet accommodation in factory is a barrel located in cellar which is
used as a water closet.





WATER CLOSET IN A NEW YORK WORK SHOP.



(E) LUNCH ROOMS.

The percentage of factories where separate lunch rooms have been provided is still very small (3.8%). In the majority of shops, lunch is eaten at the machines and stands, and frequently with unwashed hands. Even in those establishments where poisonous substances, clinging to the hands, directly endanger the life of the workers, a separate lunch room is still the exception to the rule.

Table No. IX shows manufacturing establishments in selected industries, classified according to special conveniences, i. e., adequate washing facilities, separate lunch rooms and separate dressing rooms.

TABLE NO. IX.

MANUFACTURING ESTABLISHMENTS IN SELECTED INDUSTRIES CLASSIFIED ACCORDING TO SPECIAL CONVENIENCES, 1911-1912.

INDUSTRIES.	Estab- lish- ments.	ADEQUATE WASHING FACILITIES.		SEPARATE LUNCH ROOM		SEPARATE DRESSING ROOM.	
		Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Clothing.....	341	235	68.9	18	5.3	71	50.4
Chemicals, paints and il- luminants.....	127	72	56.7	12	9.4	13	38.2
<i>Foodstuffs:</i>							
Bread and other bakery products.....	42	41	97.6	2	4.8	*	.....
Candy.....	69	41	59.4	9	13.0	*	.....
Ice cream.....	17	9	52.9	1	5.9	*	.....
Mineral water.....	84	34	40.5	.....	.....	1	3.0
Sausages and meat packing.....	73	44	60.3	3	4.1	*	.....
Miscellaneous.....	24	15	62.5	2	8.3	4	40.0
Flowers and feathers.....	94	8	8.5	.....	.....	.....	.....
Furs.....	253	250	98.8	.....	.....	40	15.8
Gloves.....	33	33	100.0	.....	.....	10	30.3
Hats and caps.....	32	31	96.9	2	6.2	12	37.5
Human hair.....	67	58	86.6	3	4.5	.....	.....
Laundries.....	124	27	21.8	7	5.6	8	57.2
Leather and rubber goods	41	33	80.5	3	7.3	10	24.4
Metal.....	130	110	84.6	4	3.1	33	25.4
Paper boxes and paper products.....	92	51	55.4	4	4.3	14	37.8
Printing.....	348	290	83.3	4	1.2	8	14.5
Stone, glass and clay....	19	13	68.4	.....	.....	5	26.3
Textiles.....	132	98	74.2	7	5.3	52	41.6
Tobacco.....	251	225	89.6	9	3.6	121	80.1
Woodwork.....	28	25	89.3	.....	.....	1	3.6
Miscellaneous.....	122	82	67.2	1	0.8	11	16.9
	2,543	1,825	71.8	98	3.8	414	30.9

One fur establishment, seven sausage and two metal establishments had no washing facilities at all.

The per cent. for the separate dressing rooms is taken to the total investigated in 1912. 1911 is not taken into consideration.

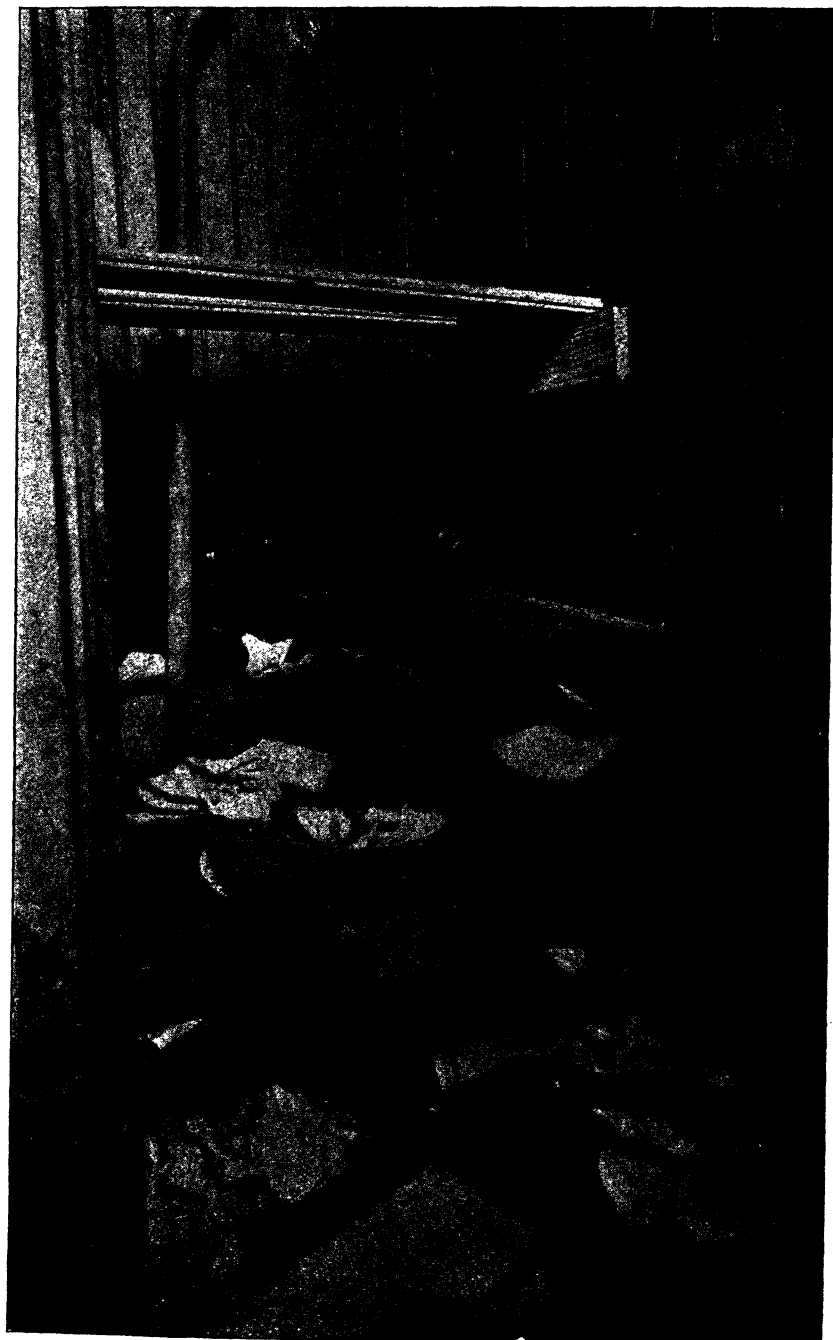
* Not clearly specified.

(F) TOILET ACCOMMODATIONS.

No part of industrial establishments is so neglected as the toilet accommodations. Their location is inaccessible in a very large number of factories. In many cases the toilets are too far from the various shops or parts of shops; in others, the toilets are located outside of the buildings, necessitating the employees walking a considerable distance in winter and in inclement weather. This is apt to be dangerous to the health of the employees as they are often over-heated from the high temperatures in which they work. In 186 of the establishments inspected, the toilets were located in the yard; in some of the chemical establishments which I have inspected, I found toilets located at a distance of over one hundred and fifty (150) feet from the central parts of the establishment. In winter the ground is often covered with snow, knee deep. In 795 shops, the toilets were found in the halls, a decidedly poor location for them, and where they are usually kept in a grossly insanitary condition.

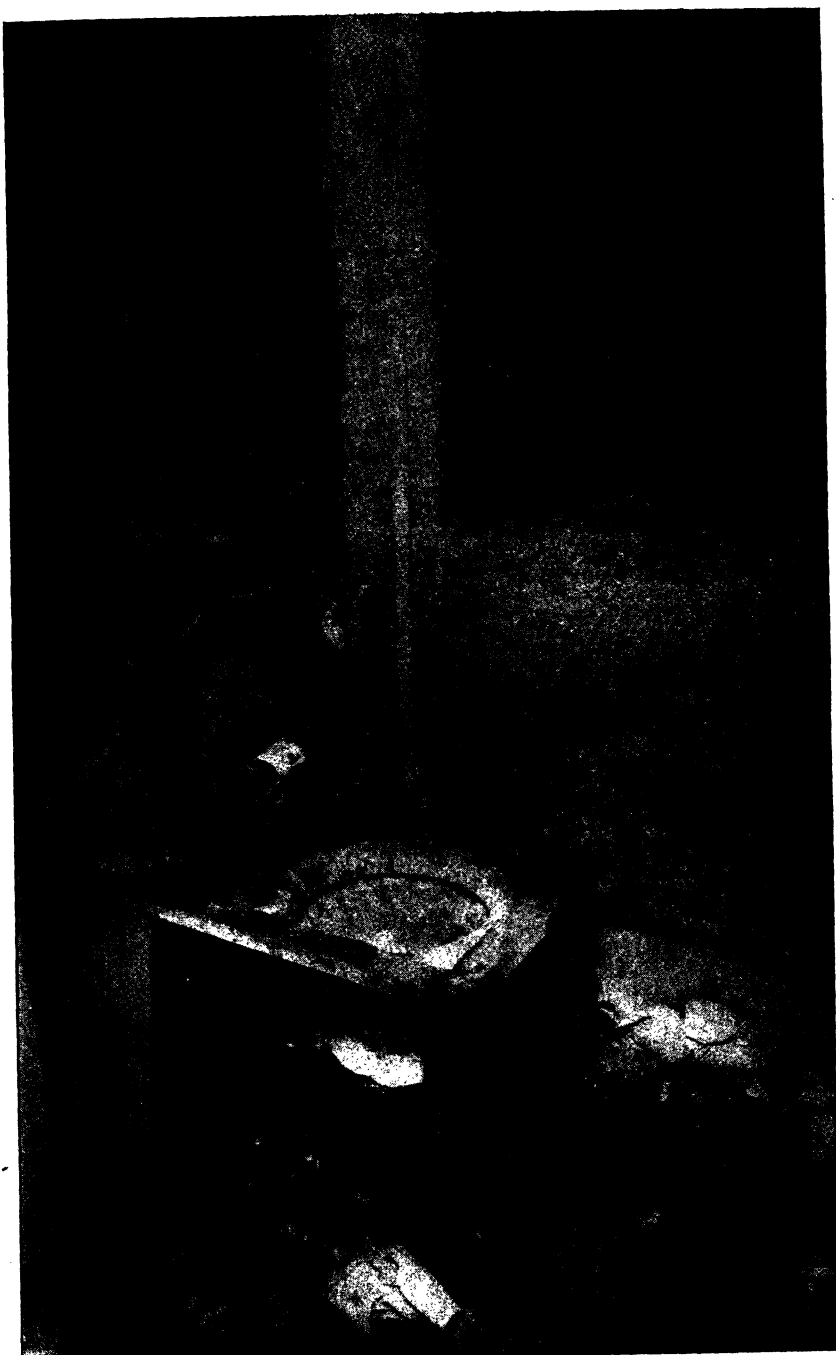
The type of water-closet found is usually fair, although there is still a very large number of establishments in which the plumbing is obsolete and unfit for use. A number of privies, school sinks, and trough closets were found. In one of the largest Brooklyn sugar refineries, the old trough closet is still used. In one shoddy mill we found that the owner (a member of the Local Health Board) had neglected to provide any water-closets for his employees. The substitute for proper toilet accommodations was a wooden barrel in a sub-cellar of his establishment. (See photograph).

Table No. XI shows the result of investigation of shops of manufacturing establishments in selected industries, classified according to location of toilets.



WATER CLOSET IN A NEW YORK SHOP.





WATER CLOSET IN A NEW YORK SHOP. -

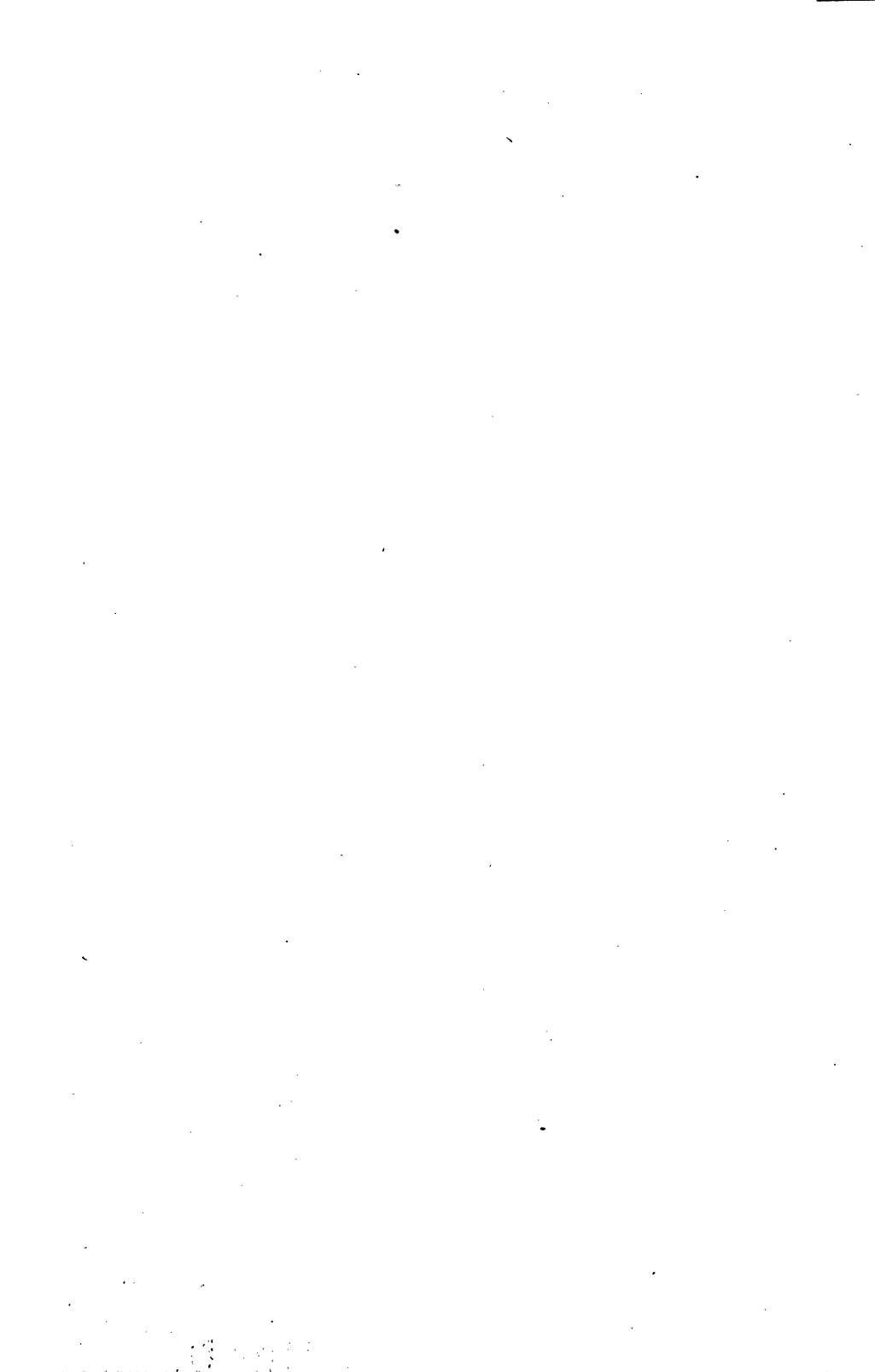


TABLE NO. XI.
SHOPS OF MANUFACTURING ESTABLISHMENTS IN SELECTED INDUSTRIES CLASSIFIED ACCORDING TO LOCATION OF TOILETS.

INDUSTRY.	Total number of shops.	YARD.		HALL.		SHOP.		ELSEWHERE.		NUMBER OF TOILETS.		No Report.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Clothing.....	523	4	0.8	31	5.9	479	91.6	10	1.9	2	0.4	2	0.4
Chemicals, paints and illuminants.....	344	53	15.4	22	6.4	229	66.6	37	10.7	3	0.9	.....	.....
<i>Foodstuffs:</i>													
Bread and other bakery products.....	61	2	3.3	27	44.2	26	42.6	2	3.3	4	6.6	.....	.....
Candy.....	197	5	2.5	101	51.3	79	40.1	5	2.5	3	1.5	8	4.1
Ice cream.....	20	3	15.0	7	35.0	5	25.0	.....	.....	5	25.0	.....	.....
Mineral water.....	112	3	2.7	26	23.2	62	55.3	.....	.....	15	13.4	.....	.....
Sausages and meat packing.....	130	16	12.3	30	23.1	57	43.8	13	10.0	2	1.5	12	9.2
Miscellaneous.....	103	.....	.....	36	35.0	64	62.1	3	2.9	.....	.....	.....	.....
Artificial flowers and feathers.....	120	2	1.7	31	25.8	83	69.2	.....	.....	4	3.3	.....	.....
Furs.....	284	1	0.3	121	42.6	161	56.7	4	1.4	.....	.....	.....	.....
Gloves.....	80	1	1.2	4	5.0	75	93.8	.....	.....	.....	.....	.....	.....
Hats and caps.....	81	4	4.9	6	7.4	68	84.0	3	*3.7	.....	.....	.....	.....
Human hair.....	131	11	8.4	56	42.8	62	47.3	.....	.....	2	1.5	.....	.....
Laundries.....	281	6	2.1	29	10.3	218	77.3	6	2.1	4	1.4	18	6.4
Leather and rubber goods.....	135	2	1.5	14	10.4	127	94.1	.....	.....	.....	.....	.....	.....
Metal.....	415	27	6.5	9	2.2	371	89.4	.....	.....	.....	.....	.....	.....
Paper boxes and paper products.....	220	.....	.....	17	7.7	301	89.4	1	0.2	1	0.2	7	1.7
Printing.....	523	12	2.3	111	21.2	382	73.6	2	0.9	5	2.3	1	0.5
Stone, glass and clay.....	60	2	3.3	6	10.0	38	63.3	1	1.7	.....	1.0	1	0.2
Textiles.....	480	.....	.....	11	2.3	469	97.7	.....	.....	.....	.....	.....	.....
Tobacco.....	472	9	1.9	77	16.3	385	81.2	5	1.0	1	0.2	4	0.8
Woodwork.....	76	6	7.9	3	3.9	372	94.7	29	6.2	2	0.4	1	0.2
Miscellaneous.....	266	14	5.2	30	11.3	201	75.6	.....	.....	15	5.7	.....	.....
Total.....	5,124	186	3.6	795	15.5	3,896	76.0	139	2.7	73	1.4	54	1.1

* Used toilet in shop of other buildings of same establishment.

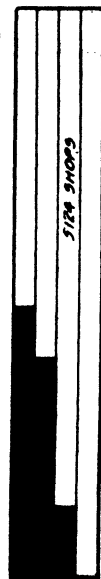
A few of the shops had toilets in both shop and hall: in other cases they were found in both the building and the yard. Conditions of these toilets were the same in all cases and in Table XIII have been counted as one unit.

Furs..... 3
Clothing..... 5
Candy..... 4
Tobacco..... 1
Woodwork..... 5

The light and ventilation of the toilet compartments are very inadequate, the majority of them having "poor" or "bad" light, as may be seen in the table presented herewith. In the absence of proper supervision, and the appointment of proper caretakers, the cleanliness of the toilets in the majority of factories leaves much to be desired.

Table No. XII shows shops of manufacturing establishments in selected industries, classified according to grade of light, ventilation and cleanliness in toilet apartments.

SUMMARY OF ALL INDUSTRIES INSPECTED



GRADE OF CLEANLINESS



LIGHT AND VENTILATION



SPECIAL CONVENIENCES

* The % for the separate dressing rooms is taken of the total number of establishments investigated in 1912, 1911 is not taken into consideration

TABLE NO. XII.
SHOPS OF MANUFACTURING ESTABLISHMENTS IN SELECTED INDUSTRIES CLASSIFIED ACCORDING TO GRADE OF LIGHT, VENTILATION AND CLEANLINESS IN
TOILET APARTMENTS.

INDUSTRIES.	Total number of shops.	LIGHT.				VENTILATION.				CLEANLINESS.									
		GOOD.		POOR.		BAD.		GOOD.		POOR.		BAD.							
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%						
Clothing.....	523	272	52.0	140	26.8	107	20.4	265	50.6	141	27.0	113	21.6	205	39.2	165	31.6	147	28.1
Chemicals, paints and illuminants	344	150	43.6	96	27.9	18	5.3	134	39.0	107	31.1	23	6.7	130	37.8	144	41.8	23	6.7
<i>Foodstuffs:</i>																			
Bread and other bakery products	61	33	62.3	7	11.5	12	19.6	35	57.4	10	16.4	12	19.6	30	49.2	11	18.0	16	26.2
Candy.....	197	62	31.5	107	54.3	19	9.6	61	31.0	108	56.3	19	9.6	46	23.4	120	60.9	27	13.7
Ice cream.....	20	6	30.0	7	35.0	2	10.0	7	35.0	5	25.0	3	15.0	4	20.0	6	30.0	5	25.0
Mineral water.....	112	31	27.7	28	25.0	35	31.2	31	27.7	31	27.7	32	28.5	20	17.8	44	39.3	31	27.7
Sausages and meat packing.....	130	74	56.9	28	21.6	14	10.8	72	55.4	30	23.1	14	10.8	76	58.5	24	18.5	24	18.5
Miscellaneous.....	103	58	56.3	40	38.8	5	4.9	58	56.3	40	38.8	5	4.9	53	51.5	39	37.8	11	10.7
<i>Artificial flowers and feathers.</i>																			
Furs.....	120	5	4.2	84	70.0	27	22.5	5	4.2	84	70.0	27	22.5	7	5.8	86	71.7	23	19.2
Gloves.....	284	127	44.7	53	18.7	104	36.6	140	49.3	56	19.7	88	31.0	99	34.9	75	26.4	110	38.7
Hats and caps.....	80	56	70.0	8	10.0	16	20.0	57	71.3	6	7.5	17	21.2	64	80.0	6	7.5	20	25.0
Human hair.....	81	46	56.8	16	19.8	19	23.4	56	69.1	8	9.9	17	21.0	45	55.6	13	16.0	23	28.4
Laundries.....	131	28	21.4	74	56.5	115	40.9	22	16.8	73	56.0	115	40.9	9	6.9	103	78.6	17	13.0
Leather and rubber goods.....	281	62	22.1	15	5.3	13	4.6	63	22.4	18	6.4	22	16.3	82	60.7	24	17.8	100	35.6
Metal.....	135	106	78.5	15	11.1	9	6.7	93	68.9	18	13.3	22	16.3	293	70.6	63	15.2	55	13.3
Paper boxes and paper products.....	415	326	78.6	43	10.4	42	10.1	259	62.4	82	19.8	70	16.9	293	70.6	63	15.2	55	13.3
Printing.....	220	147	66.8	49	22.3	19	8.6	137	62.3	60	27.2	18	8.2	110	50.0	63	28.6	38	17.3
Stone, glass and clay.....	523	183	35.0	284	54.3	43	8.2	183	35.0	281	53.7	46	8.8	167	31.9	307	58.7	36	6.9
Textiles.....	60	49	81.7	7	11.7	4	6.6	41	68.3	16	26.7	3	5.0	41	68.4	11	18.3	8	13.3
Tobacco.....	490	318	64.9	64	13.1	80	16.3	312	63.7	61	12.4	91	18.6	254	51.8	109	22.3	96	19.6
Woodwork.....	472	219	46.4	127	26.9	106	22.5	187	39.6	141	30.0	124	26.2	191	40.5	160	33.9	98	20.8
Miscellaneous.....	76	54	71.1	10	13.1	12	15.8	44	57.9	15	19.7	17	22.4	45	59.2	18	23.7	13	17.1
Total.....	266	141	53.0	58	21.8	32	12.0	133	50.0	64	24.0	34	12.8	107	40.2	75	28.2	49	18.4
	5,124	2,530	49.3	1,345	26.4	844	16.4	2,373	46.3	1,437	28.0	910	17.8	2,144	41.9	1,755	34.2	985	19.2

Of the 5,124 shops investigated, 73 shops, or 1.4%, had no toilet.
No report obtained on light and ventilation for 6.5%, and on cleanliness for 3.3% of shops investigated.

(G) SANITARY CARE AND COMFORTS.

Special Clothing, etc.:

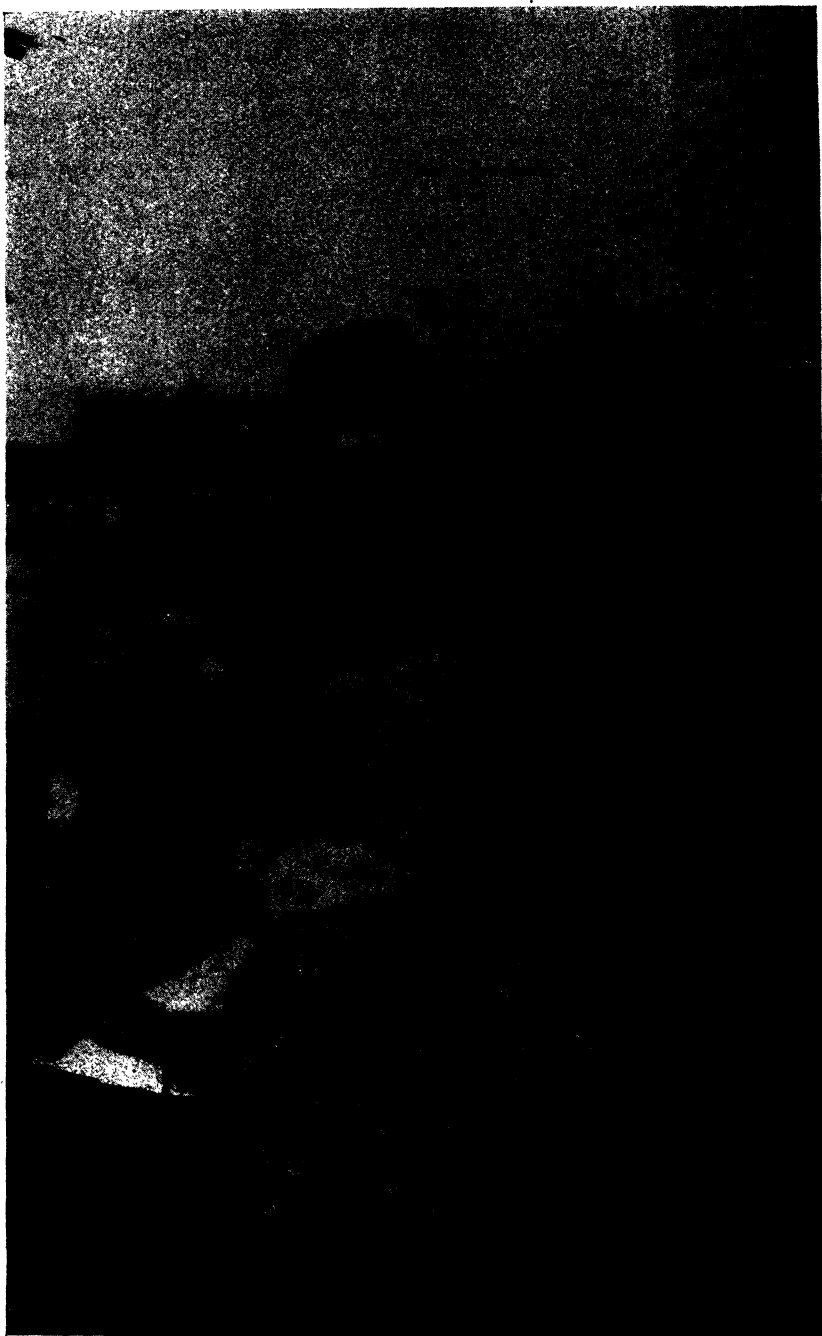
In only very few industrial establishments have our investigators found special clothing provided for the use of the employees; or eye glasses, overalls and gloves, which should be compulsory where the dangers of the specific industries require their use.

Medical Supervision:

In only a very small percentage of the establishments are first-aid facilities provided; minor accidents receive but scant attention. In not one of the establishments inspected by the inspectors or by myself was provision made for proper instruction of workers in the specific dangers of their trade, in the prevention of these dangers, in the care of their persons or in knowledge of the ordinary risks of their daily work.

The absence of such necessary instruction is one of the greatest evils suffered by industrial operatives; the most frequent cause of accidents and ill health is the ignorance of the workers occupied in the dangerous trades.

A campaign of education is of the first importance for the employers as well as employees — to educate employers in their duties towards their workers and in the means and devices for the prevention of the ills of modern industrial life and to educate workers in knowledge of the common dangers of their occupations and in the preservation of health and life.



CORDAGE COMPANY, AUBURN, N. Y.

Picture taken at 6 o'clock in the morning. The mother has just returned from night work and is giving the babies their daily petting.

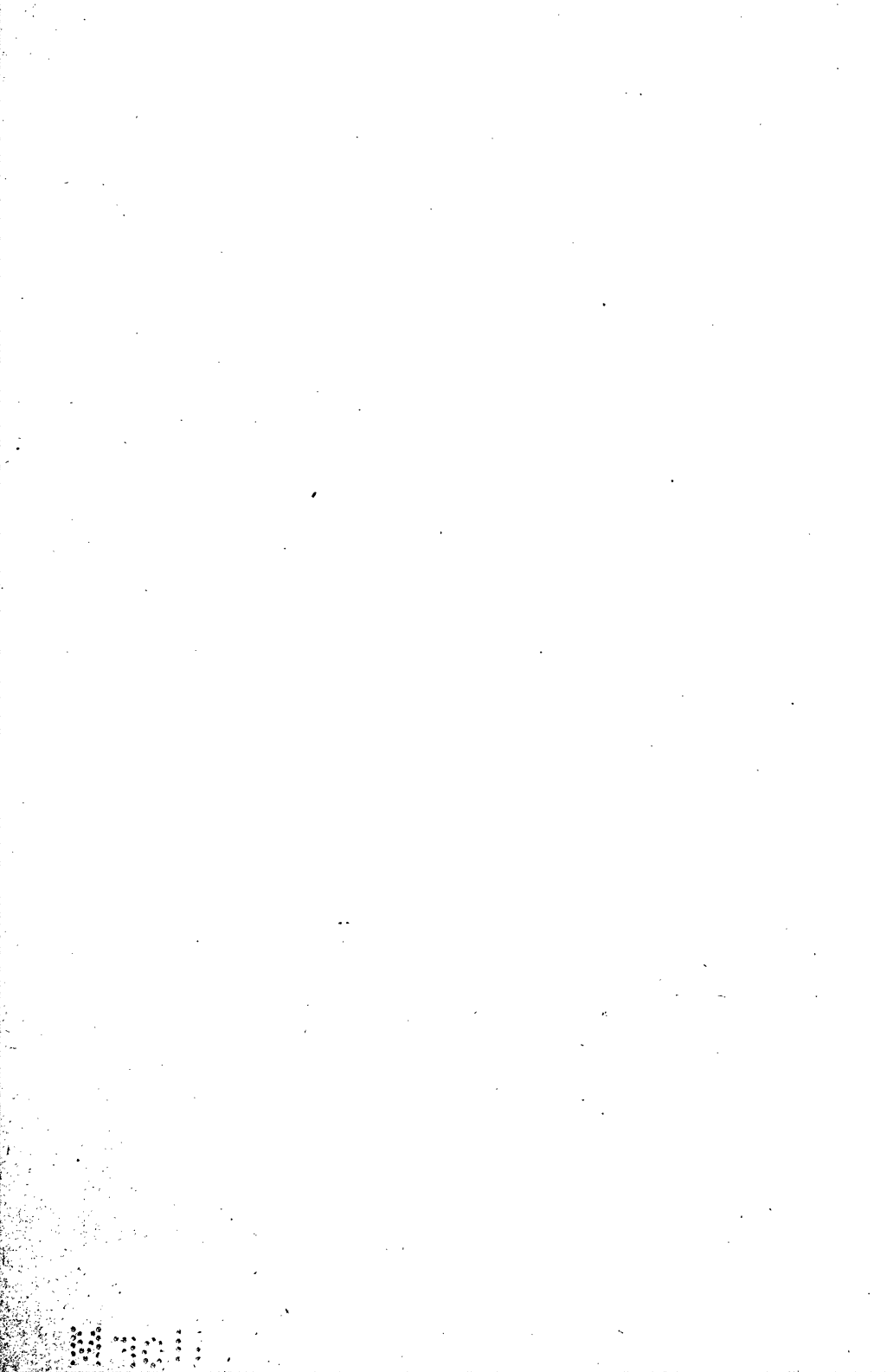
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CORDAGE COMPANY, AUBURN, N. Y.

A night worker who has had to "lay off" recently on account of her sick baby; she is pale and sick-looking, but she says she must go back to the factory next week to help support her children.



CHAPTER III

NIGHT WORK OF WOMEN.

I.

Next to child labor, night work of women is the greatest evil of modern industrial life.

The participation of women in industry, although so general, has never been regarded as an entirely normal condition of society. When the participation of women in industrial life is carried on under abnormal conditions which endanger their health and lives, thus constituting a menace to future generations, such industrial participation must be regarded as an economic and moral injustice.

All regular night work is inimical to health. This subject was discussed at length in the inquiry into the evil effects of night work upon the health of bakers, published in the preliminary report of the Commission. It was there stated that such work upsets the customs of normal life, banishes the workman from social life, and greatly increases the morbidity and mortality of the workers. If habitual night work so impairs the health of men, its injurious effects upon women are obviously more far-reaching, and society is culpably negligent in permitting work of this kind to continue.

The effect of night work on women has been a matter of discussion and agitation abroad for a number of years. In Germany, the factory inspectors have demonstrated the high mortality rate among female night workers. The French commission of 1890 found a high infant mortality among the children of women night workers.

The objections to night work of women are many. Among the principal ones are the following: lack of sunlight; lack of normal sleep; no compensation in the restless interrupted sleep of day for the sleeplessness of night; the abnormality of sleeping by day; abnormal change in daily life; the destruction of home life; impossibility of properly caring for home and children; lack of restraining influences; day work besides the arduous night tasks.

It has even been claimed that night work is economically unnecessary, and does not compensate for the evils which result from it.

Night work of men is prohibited in a number of Continental countries. As the law relates to bakers, night work is prohibited in Italy and Sweden, in certain cantons of Switzerland, and in several other countries.

In 1902, a Commission was appointed by the International Association for Labor Legislation, to devise means for securing the international prohibition of night work for women. Representatives from fourteen European powers were assembled at Berne, Switzerland, on September 26th, 1906. By January 14th, 1907, the following countries, viz.: Austria-Hungary, Belgium, France, Germany, Great Britain, Italy, Luxemburg, Portugal, Sweden, Switzerland and the Netherlands, had ratified the provisions of the Commission that a minimum period of eleven consecutive hours be set for the duration of the night rest, to include the time between 10 P. M. and 5 A. M. in all cases.

According to the August, 1912, Bulletin of the International Labor Office, the following countries have already passed laws prohibiting night work of women: Austria-Hungary, Belgium, France, Germany, Great Britain, Italy, Luxemburg, Portugal, Sweden, Switzerland and the Netherlands. It is also said to be forbidden in Bulgaria, Algeria and Tunis. Proposed bills for its prohibition have been introduced in Spain and Denmark.

The United States did not take part in the Berne Convention, since the Government cannot bind separate States to enact legislation restricting the hours of labor. In some States of the Union, there is even a direct legalization of the night work of women. Thus in Wisconsin in 1911, a bill was passed legalizing an eight-hour shift for women, between 8 P. M. and 6 A. M. A similar law was passed in Connecticut in 1908, and bills to the same effect were proposed in the Legislatures of Maryland and New Jersey in 1912. In fact, night work is permissible in all States of the Union except Massachusetts, Indiana and Nebraska.

As to the extent of night work of women and children in the United States, it is difficult to obtain reliable data, as this condition very often exists unknown to factory inspectors and labor departments. According to the United States Report on Condition of Women and Child Wage Earners in the United States, Vol. 1, page 274, there were thirty-one cotton mills in North

NEW YORK STATE FACTORY INVESTIGATING COMMISSION.

G. S I. 327.

Inspector — M. S. Orenstein.

Date — 7/25/12.

City. Auburn.

County. Cayuga.

Industry. Mfg. Twine.

Name of Estab., Twine Works.

This is a rather old building. Parts of it have very good light, while other sections on the same floor are dark and have to be illuminated with electricity. This is particularly true of the first floor sliver machine department.

Toilet and dressing room facilities are good. There are metal sanitary lockers for women, and wooden ones for men. For the latter metal ones are to be installed. There is an emergency room with a first-aid-to-the-injured chest. The dressing rooms are accessible, there being two on a floor. There is a tub and shower for men in the engine rooms.

The twine here made is manufactured for the most part from hemp. In the opening department these bales of hemp are cut open by men. They are paid 14c a bale and, if expert, can open 14 bales a day. So said a foreman. One of the Poles working here said he averaged \$1.60 a day. Though this room has skylights as well as windows, clouds of dust are constantly rising. The men are covered with tiny flakes of hemp.

In the preparation departments, this hemp is combed out and drawn by machinery. Women tend the sliver-machines. They wear metal finger guards which not only protect them, but keep intact the strands of hemp which are piled up by the women. A number of women were seen to pull piles of hemp weighing about 150 lbs. across the floor. The floor, however, was very slippery with oil, and pulling was made easy. Women at this occupation have to stand a great deal of the time. There is a great deal of dust here also. The noise of the machinery is quite deafening.

In the spinning rooms one girl tends to 8 or 9 reels, or 4 to 4½ machines. The clatter of machinery here is so frightful that a voice can hardly be heard below a shriek. Some of the girls say that they have gotten accustomed to it. Spinners take out the full bobbins, which are encased in cylindrical receptacles, and replace them with empty ones. They also tie broken threads. When the machines are going well, a few minutes of rest is afforded the girls and they can sit down on stools at their machines. The spinning room in the basement of this building is 8 or 9 feet high, light is rather poor and on hot days it must be a veritable inferno. There is also considerable dust in this process.

In the balling department, the twine is made into balls by machine. Women are also found here. They can occasionally sit at their work.

Workers:

Practically all of the workers are Italians and Poles. There are a few Greeks. Foremen and those in machine shop are Americans. There is a very large number of Polish and Italian girls on the day shift. Most of

the women on the night shift are married. The appearance of the women workers is very disheartening. They are stolid, worn-looking and pale. Their clothes, faces and hands are covered with oil and hemp dust. Most of the women cover their heads with handkerchiefs. The men do not look much healthier than the women. Most of the workers live in the neighborhood, but about half do not go home at lunch time. There is a lunch room where food is served at cost price by the firm.

Hours:

A number of the women questioned said that they begin about 6.30 A. M., lunch from 12 to 12.30 and go home at 6 P. M. On Saturdays they work until 5 P. M., making a total of $64\frac{1}{2}$ hours a week. The superintendent stated that women and men on the day shift work 60 hours a week, and those on night shift, 50 hours a week, beginning at 7 P. M. to 5.30 A. M., with one-half hour for lunch. There are 81 men on the night shift and 100 women. "We employ no women under 21 at night. Most of the night workers are married; they like it because they can get home, sleep awhile and work around the house during the day. We treat the night help with just as much consideration as the day help. There is a matron in charge, just as during the day. The night workers work only five nights, making 50 hours a week, but they get 17% more pay as an inducement, so they are really paid for 60 hours work."

Wages:

With few exceptions, workers are paid on a piece basis. "All beginners start at 85c a day; then in a reasonable time they must be able to earn \$1 a day on the piece basis. Common laborers begin at 17c an hour. Good women spinners make as high as \$12 a week, and after you get on to spinning it's like kindergarten work. The International wants to treat its people right and doesn't want something for nothing," said superintendent.

The following figures were gotten from workers and the liability book:

Girl on sliver-machine working for 2 years, averages \$1.50 a day. Another earns \$1.62 a day. One girl spinner on 9 wheels averages \$7 a week. Another \$1.37, one \$1.77 and one 96c per day. One woman baller earned \$1.08 per day and another \$2.50 per day. One man here five years makes \$2.05 per day opening bales.

According to the "Personal injuries" files, kept for the Liability Co. there have been about 100 accidents. A number have been due to dropping weights on feet, cutting fingers in opening department, catching fingers on pins of sliver machines. In a number of instances infections are reported because person did not at once treat injury. Most of the injuries seem to be of minor character.

Dangerous Elements:

Dust is the predominating evil. The intense noise of machinery must have some effect on hearing and the nervous system. The investigator had ring-

ing in her ears and was somewhat deafened when she went from the spinning room into the office. Standing is another harmful element in this work, even though stools are provided.

The superintendent said that the Chicago branch is working on a system of ventilation, and when they succeed the system will be installed in this plant.

A Welfare secretary is employed to look after the health and comfort of the women. She renders first-aid to all the employees.

There is a mutual benefit society to which employers and employees contribute.

The night watchman said that five years ago all the employees were Americans. The plant shut down for three months for repairs and when it reopened could not get American help, hence took foreigners.

SPECIAL VISIT.

7/25/12.

9.15 — 11 P. M.

Seven months of this year, and three of last, there has been night work. The firm accounts for this by the unusual demand for twine. Eighty-one men and 100 women are on the night shift. With one or two exceptions, all the women are Polish and the majority of them are married.

a) One woman spinner has children, ages 7, 4 and 3. Her husband works here in the daytime. She says she cannot work during the day because she must look after her children and house. She snatches a few hours sleep in the morning while a neighbor looks after the children.

b) A small gray-haired, stooped little woman, 45 years old and looks ten years older, has been a widow 13 years and has 4 children, the youngest of whom is twelve. She has been a mill hand for 30 years, and in this plant 2 years. Averages \$7 a week. Two of her children are just beginning to earn a living. Says she gets little sleep, for she must attend to household duties. She is used as an interpreter, being able to speak German, Polish and English. She spins.

c) Widow, childless, boards with Polish family, makes \$2 a night spinning when work is good. Averages \$1.50.

d) American woman, balling, makes \$10—\$12. Husband is a mechanic. She has two children.

e) Widow, spinner, has one child.

f) Girl, spinner, earns from \$1.10 to \$1.50.

g) Large strapping young woman, spinner, has two children, aged 1 and 3. Husband is a mechanic. Works at night because she cannot be spared during the day. Works to supplement husband's wages.

h) Hollow chested, flat hiped, drawn-faced little woman, has three children. Husband works in the day.

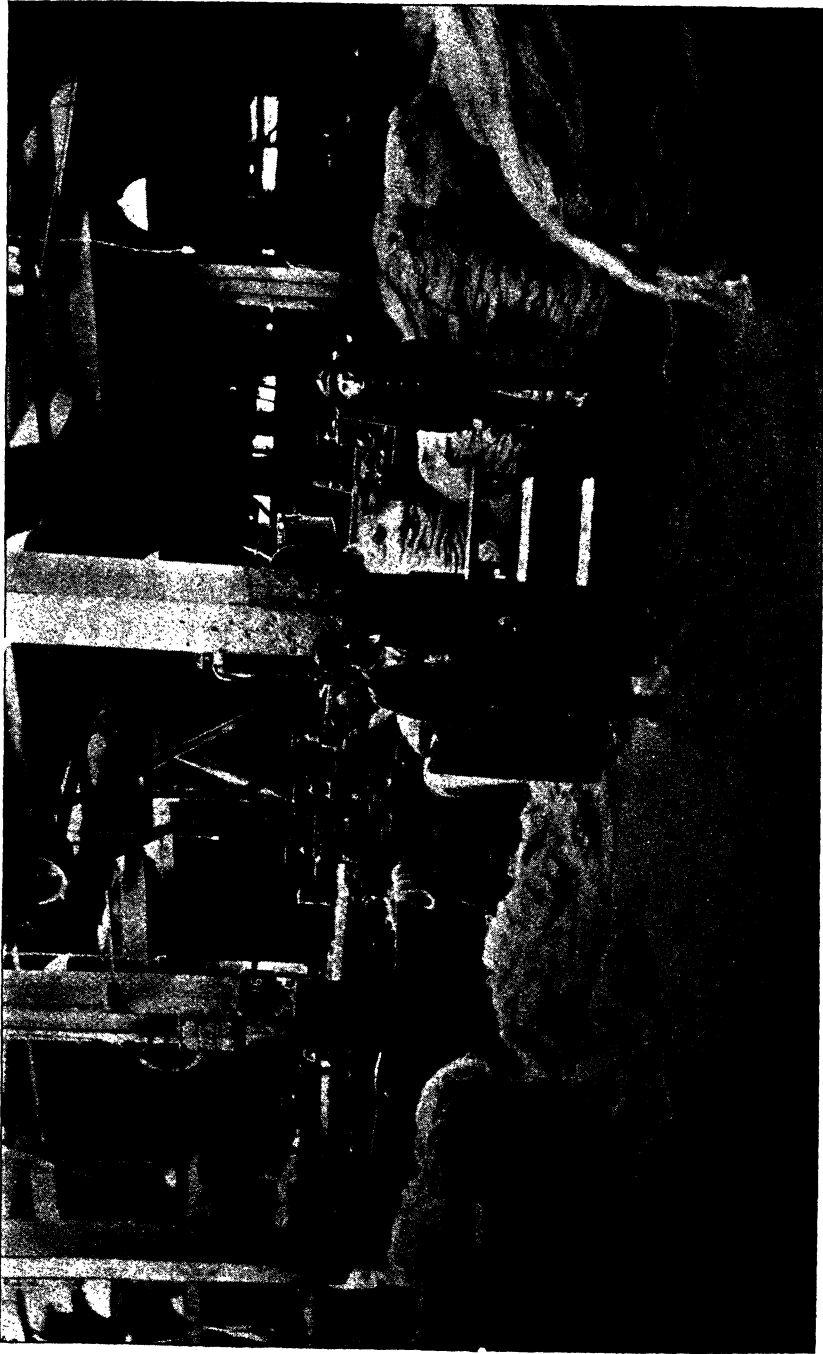
- i) One man, piler, earns \$10 a week. Another \$7.50.
- j) Small emaciated little woman has one child.

The workrooms are lighted by Tungsten burners, suspended from ceiling and having green shades. Floors are very slippery. Women push very heavy barrels of bobbins and piles of hemp. Rooms were quite warm. Watchman says that on very hot nights the temperature on top floor is 108 deg. F.

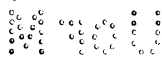
In the opening room the dust in the air was thicker than during the day, because, as the foreman explained, the wind was blowing in a certain direction. He says new workmen cough considerably, but get used to it. The hemp dust here is not softened by oil and is more cutting. The night matron says she always puts a wet handkerchief to her nose and mouth, if it is necessary for her to come to this room, but that the workers get used to it. She also said she could not stay as long as the investigators did in the spinning room because she couldn't stand the noise—but that the Poles were used to it. It was impossible to keep from coughing or sneezing while in this room.

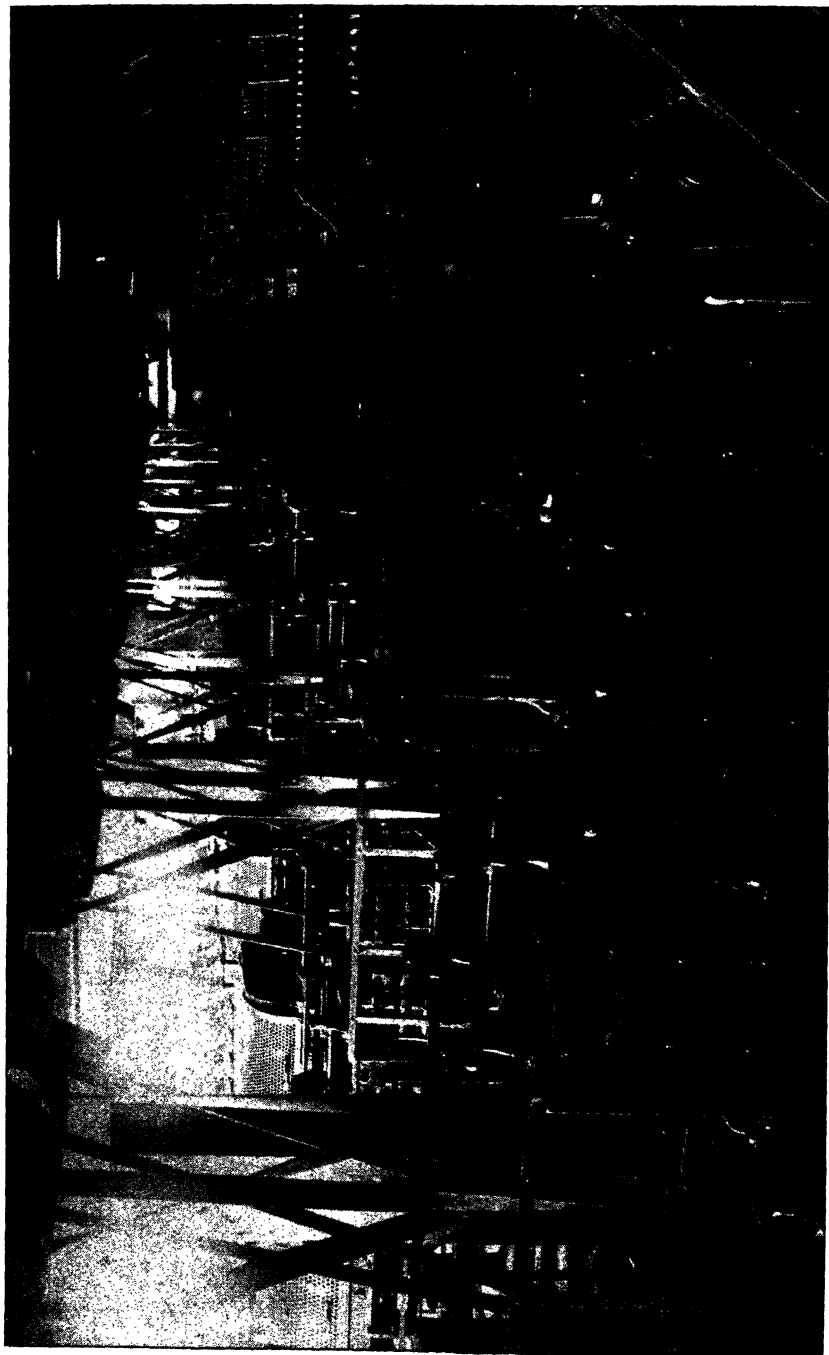
Getting exact hours of workers was difficult. The superintendent said day workers started at 7 A. M., but the women questioned said they came at 6.30 A. M. The night watchman questioned at 11 P. M. said he worked from 6 P. M. to 7 A. M. At least I have to stay until a little after 6.30 in order to let in the day shift at that time. This confirmed the hours given by the workers.

The women as a whole were a disheartening group, in their oily dust laden clothes with drawn white faces and a stooped gait.



CORDAGE COMPANY, AUBURN, N. Y.
Interior of machine room.





CORDAGE COMPANY, AUBURN, N. Y.
Spinning machines.—Four of these machines, with two fliers each, are attended by one woman worker.

Carolina which were operated by night, in which there were 848 women and children performing regular night work. In South Carolina there were also five mills operated at night, employing 188 women and children. This probably represents but a small part of all the establishments, especially in textile industries, which are employing women and children for night work. Some textile industries in the cities of the Middle States run at night either regularly or occasionally, and employ women for the night shifts.

Nor can the extent of night work of women be properly determined in New York State. That there is a great deal of occasional night work of women in many industries, between the hours of 6 p. m. and 12 midnight, is well known. Such work is common in laundries, binderies, candy factories, in certain seasonal trades as in the garment trades, and in many other industries. There is also a considerable amount of regular night work in mercantile establishments, in restaurants, among agents of elevated railroads (notably in Brooklyn), and among the telephone workers in the exchanges.

In the investigations of the New York State Factory Investigating Commission, one notable case was found in which night shifts of women were regularly employed in a large industrial establishment. In this establishment, which is described fully in the following pages, from 170 to 200 women have been employed a certain number of nights a week for several years. It is claimed by the owners that their night shift is an economical necessity, by reason of the great demand for their product. It is also asserted by the owners that the work to be performed can best be done by women, and that it would be impossible to get sufficient number of men workers to do the work at night.

II.

Several inspections have been made of the above mentioned industrial establishment, which is located in a town of central New York. I made the last inspection in person on October 18th, 1912.

The general sanitary conditions of this establishment are fair; certainly not worse than those existing in many establishments throughout the State, and much better in many respects. As will

be seen from the report of the inspection, the sanitary condition of the mill, as far as they relate to washing facilities, lockers, dressing rooms, toilet accommodations, lunch rooms and medical service, are in advance of the conditions existing in the cotton, woolen and other mills throughout the State.

As to wages, no comparison has been made of the wages prevailing in this establishment with the average wages prevailing in other mills. From a cursory investigation, however, it appears that the wages are not lower than in other smaller establishments. The hours of labor are according to legal requirements.

Besides the report of the inspection of this establishment, an analysis is given in this chapter of the personal histories of one hundred of the women night workers.

INSPECTION OF OCTOBER 18TH, 1912.*

Conditions of Cordage Mill were as follows:

Raw Product:

Hemp, imported from the Philippine Islands and Yucatan.

Finished Product:

Twine, used for agricultural machines.

Building:

Located in a town in central New York. Was erected about 1893 or 1894. Consists of two (2) stories and basement, brick and frame. Building L-shaped. Dimensions 90 x 300 feet and 60 x 100 feet.

Fire Protection:

Building is provided with automatic sprinklers (Grinnell), five stairways made of wood, and one fire escape with counterweight drop ladder. Building is also provided with sixty-two (62) chemical extinguishers, and one hundred and eighty (180) fire buckets. There is a weekly drill of employees, and a fire brigade organization among the employees. The Company claims that certain departments have been cleared at recent fire drills within forty seconds. The automatic sprinklers are fed by a 50,000 gallon reservoir (water pressure 45 lbs.).

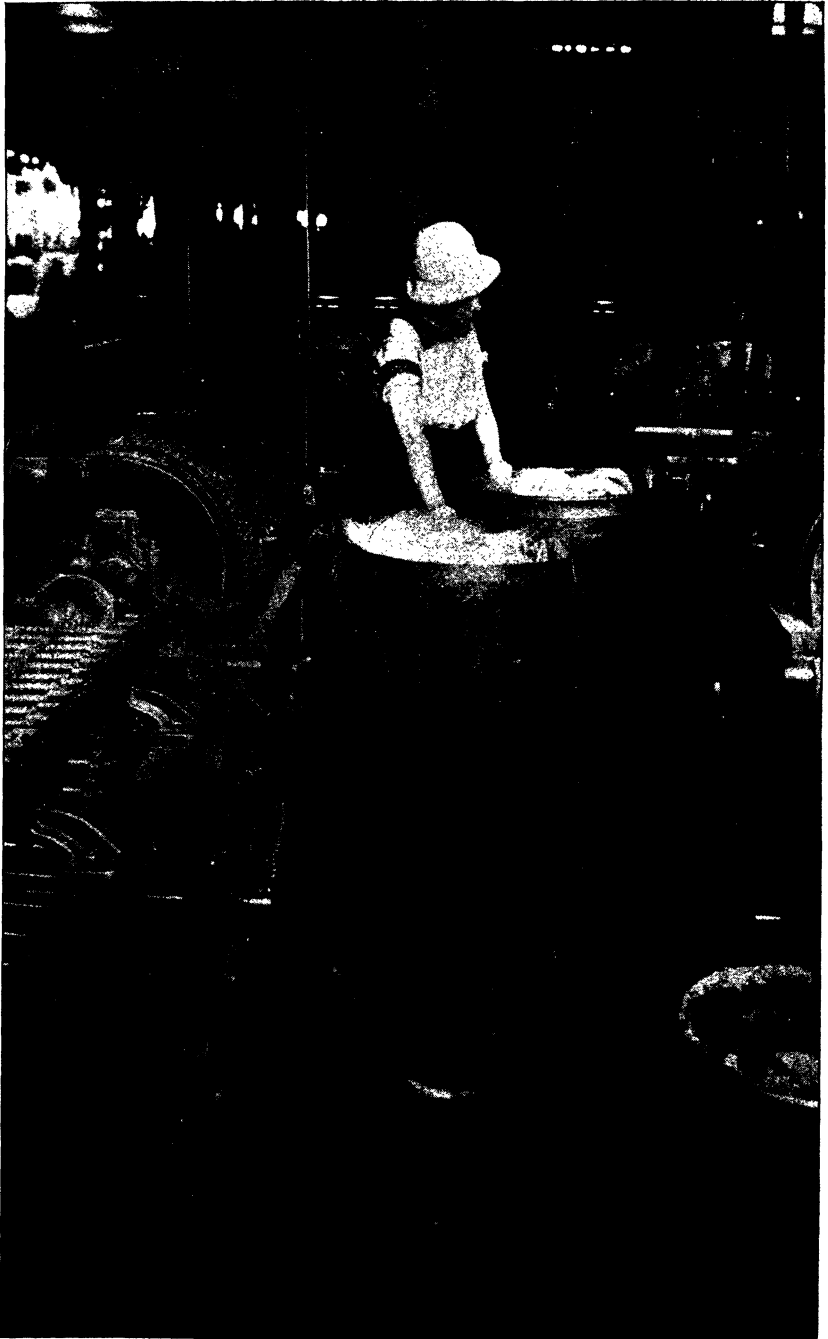
On July 26th, 1912, an inspection of this plant was made by Marie S. Sabsovitch. Her report to the Commission is set forth opposite page 441.



CORDAGE COMPANY.
Feeding hemp into a machine to make twine.







CORDAGE COMPANY, AUBURN, N. Y.
These large hampers of hemp are handled by women workers.



Workers:

On October 1st, 1912, there were in the plant 410 wage earners, of whom 150 were women and 160 men. No minors under sixteen are employed. The night shift consisted of 200 persons; 130 or 140 are women, 60 or 70 are men. No males under eighteen nor females under twenty-one are permitted to work in the night shift.

Of the mill workers there are very few speaking English. Poles are predominant, Italians next. A large proportion of the women are married.

Processes:

The hemp is brought from abroad in tied bales. The first process is the cutting of the ropes and opening the bales. This is done by men. The second process is putting the hemp into the breaker machines, of which there are two. These machines are operated by men, and here the hemp is broken up into narrow strands. From the breakers the hemp is fed to the spreading machines, of which there are two, and thence to the "bell" machines. These machines are operated by men at the feeding end of the machine, and by women at the receiving end of the machine. From the "bell" machine, the hemp is fed into the "felt" machine, operated by men and women. From this machine, the hemp is fed into the finishing machine, which is the final preparatory process through which the hemp goes before being sent to the spinning room.

In the spinning room, the prepared hemp is fed through spinning machines having two "flyers" and operated by women, one woman operating four machines, or eight "flyers." From the spinning machines, the thread is ready to go into the balling machines where it is rolled into balls, after which it goes into the packing and storage room.

Hours of Labor:

The hours of labor are from 7 A. M. to 12 M., one hour for lunch, and from 1 P. M. to 6 P. M. daily; Saturdays from 7 to 11 A. M., making fifty-four hours weekly work. The men work the same hours, except that the workers in the machine shop work until 12 M. on Saturdays, making fifty-five hours for the

week. The night force work from 7 P. M. to 12 midnight, one-half hour for supper, and from 12.30 A. M. to 5.30 A. M., five nights a week, making fifty hours weekly. The supper hour at midnight was cut down from an hour to thirty minutes by authority of the Commissioner of Labor, by reason of the operators staying in the works. Power starts five minutes before the whistle blows for the commencing hour, and no one is allowed to begin work until the whistle blows. All foremen have positive instructions that employees are not allowed to work before the regular time.

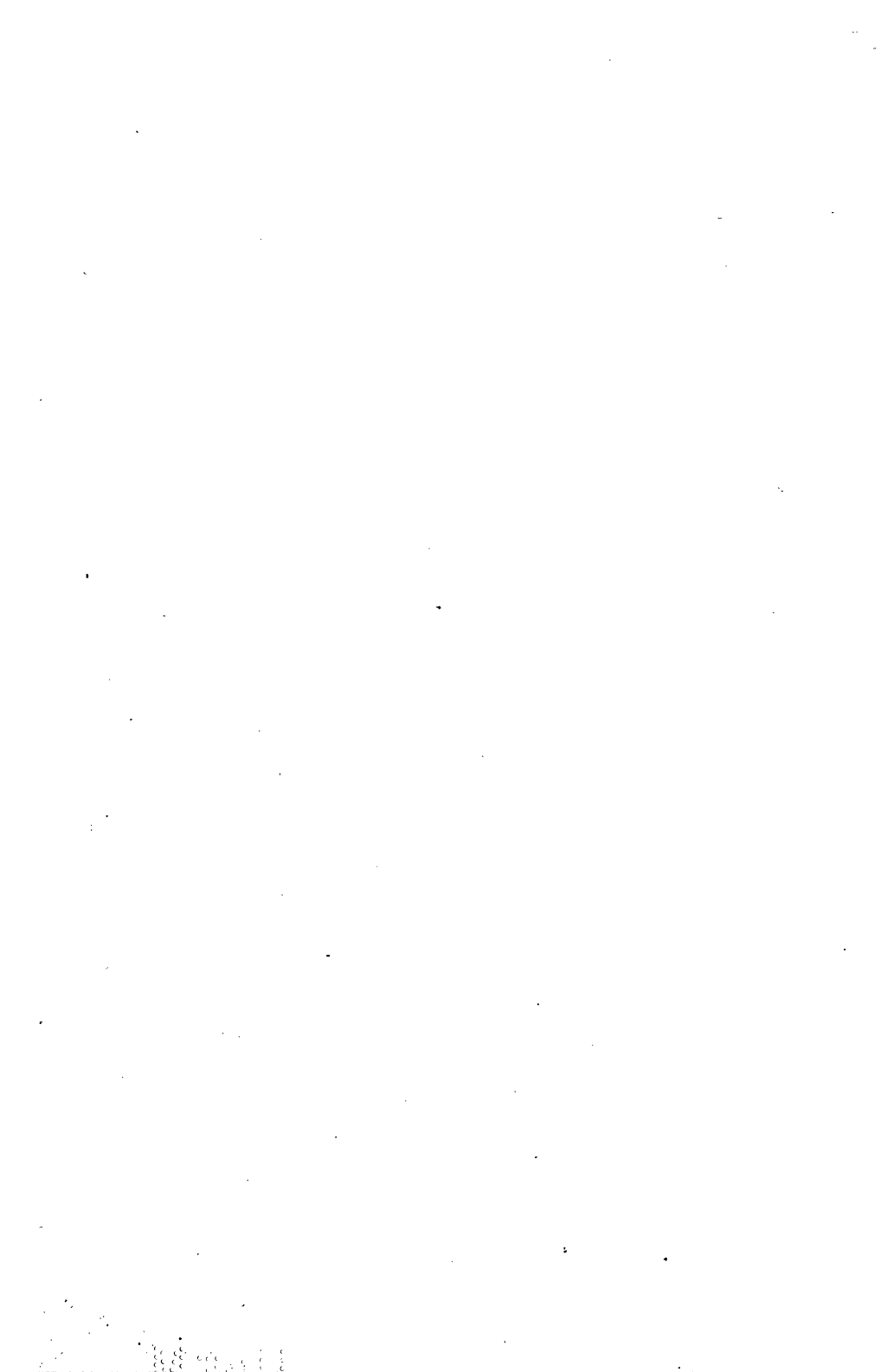
Night Work:

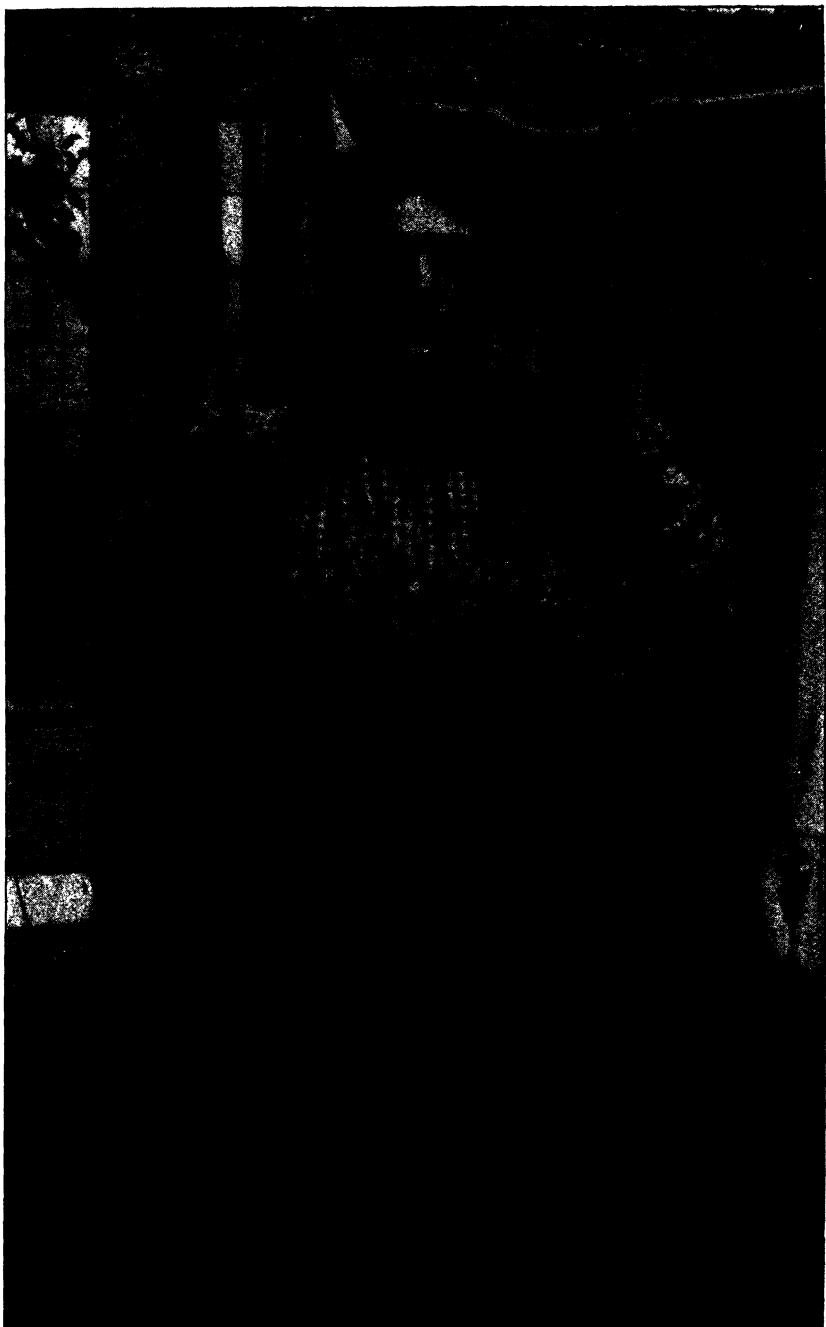
Night shifts have been employed by this mill for a number of years. In 1912, the night work began in January, and has been continued since then. Night work was authorized in these works by the Department of Labor. There are about two hundred persons in the night shift, of whom 130 or 140 are women. No males under eighteen nor women under twenty-one are allowed to work in the night shift. The reason for the necessity of the night shift is explained by the management to be the great demand for twine during the last few years. The reasons for employing women in the night shifts are the following:

1. If night work of women were prohibited in this state the spinning and balling.
2. That there is no possibility of getting men to work during the night, there being a lack of men workers even during the daytime.
3. That it would be impossible to engage men at the same rates that are paid women, and get the same efficiency.

The management claims that

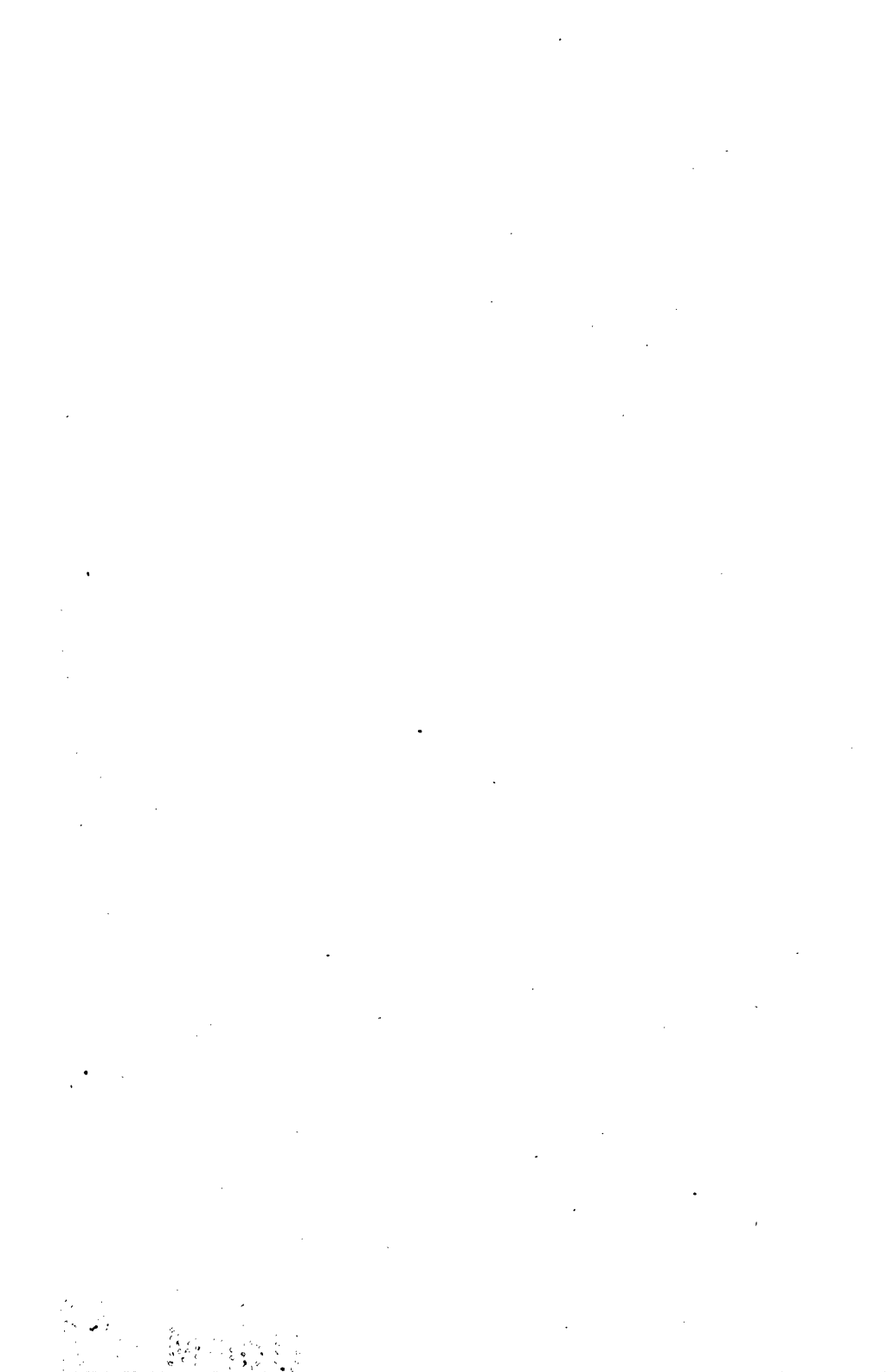
1. If night work of women were prohibited in this State the company would be compelled to transfer the night work from this plant to plants in other states.
2. That if night work of women were prohibited throughout the United States, the company would be compelled to enlarge its buildings and equipment.





CORDAGE COMPANY, AUBURN, N. Y.

A night-worker who had just finished a washing large enough to fill five long clothes lines.



Wages:

Most of the women in the twine works are piece-workers. According to the management, the rates of wages are as follows:

Preparing Room.—Thirteen to twenty-six cents per hour for women; eighteen to twenty-three cents per hour for men.

Spinning Room.—Spinners, fourteen cents per hour; ballers, fourteen cents per hour (all women).

The night workers are paid 17½ per cent increase over the day rate. Since October 1st, when the fifty-four-hour week was introduced, the management claims that there was no reduction in wages, nor any reduction in the total amount earned by the employees in the various departments. The following is a copy of a statement taken from the books of the firm, and confirmed and verified by Mrs. Marie Orenstein of the Labor Department. The statement shows: (1) check number; (2) occupation; (3) ages; (4) hours, and (5) wages of ten female spinners, ten female ballers and ten female preparation hands, for the weeks ending August 24th and October 5th, respectively.

STATEMENT.

(1) Check Number.	(2) Occupation.	(3) Age.	WEEK ENDING AUGUST 24, 1912.		WEEK ENDING OCTOBER 5, 1912.	
			(4) Hours.	(5) Wages.	(4) Hours.	(5) Wages.
59	Baller.....	21	56	\$7.35	54	\$8.09
62	Baller.....	19	56	7.04	54	8.43
63	Baller.....	23	56	8.61	54	8.62
63	Baller.....	19	56	7.91	54	7.74
68	Baller.....	20	56	5.74	54	6.58
69	Baller.....	21	56	6.48	54	7.32
72	Baller.....	22	56	6.76	54	7.51
73	Baller.....	21	56	6.90	54	7.28
76	Baller.....	20	56	7.14	54	8.81
77	Baller.....	18	56	6.09	54	7.70
220	Spinner.....	25	56	7.15	54	7.36
225	Spinner.....	17	56	7.29	54	7.56
226	Spinner.....	23	56	8.06	54	7.91
243	Spinner.....	17	56	7.33	54	7.63
251	Spinner.....	25	56	7.99	54	8.19
259	Spinner.....	20	56	7.54	54	7.63
261	Spinner.....	27	56	7.44	54	7.93
283	Spinner.....	19	56	7.36	54	7.42
288	Spinner.....	17	56	7.45	54	7.40
293	Spinner.....	16	56	7.80	54	7.88
529	Preparation hand...	21	56	8.56	54	8.85
580	Preparation hand...	24	56	8.56	54	8.17
531	Preparation hand...	20	56	7.67	54	7.70
490	Preparation hand...	19	56	7.67	54	8.17
475	Preparation hand...	17	56	7.18	54	7.29
494	Preparation hand...	22	56	7.52	54	8.03
549	Preparation hand...	18	56	7.52	54	8.03
490	Preparation hand...	19	56	7.67	54	8.17
494	Preparation hand...	22	56	7.52	54	8.03
528	Preparation hand...	20	56	8.56	54	8.17

According to analysis of the personal history of one hundred night workers in the twine works (the histories taken by Miss Gertrude E. Smith and Miss Grace Potter), the wages per week to the night workers, according to their pay envelopes, were as follows:

Eleven women, wages from \$6 to \$6.99; thirty-two women, wages from \$7 to \$7.99; twenty-eight women, wages from \$8 to \$8.99; six women, wages from \$9 to \$9.99; one woman, wages, \$12.

Twenty-two women did not work full time.

Safeguarding of Machines:

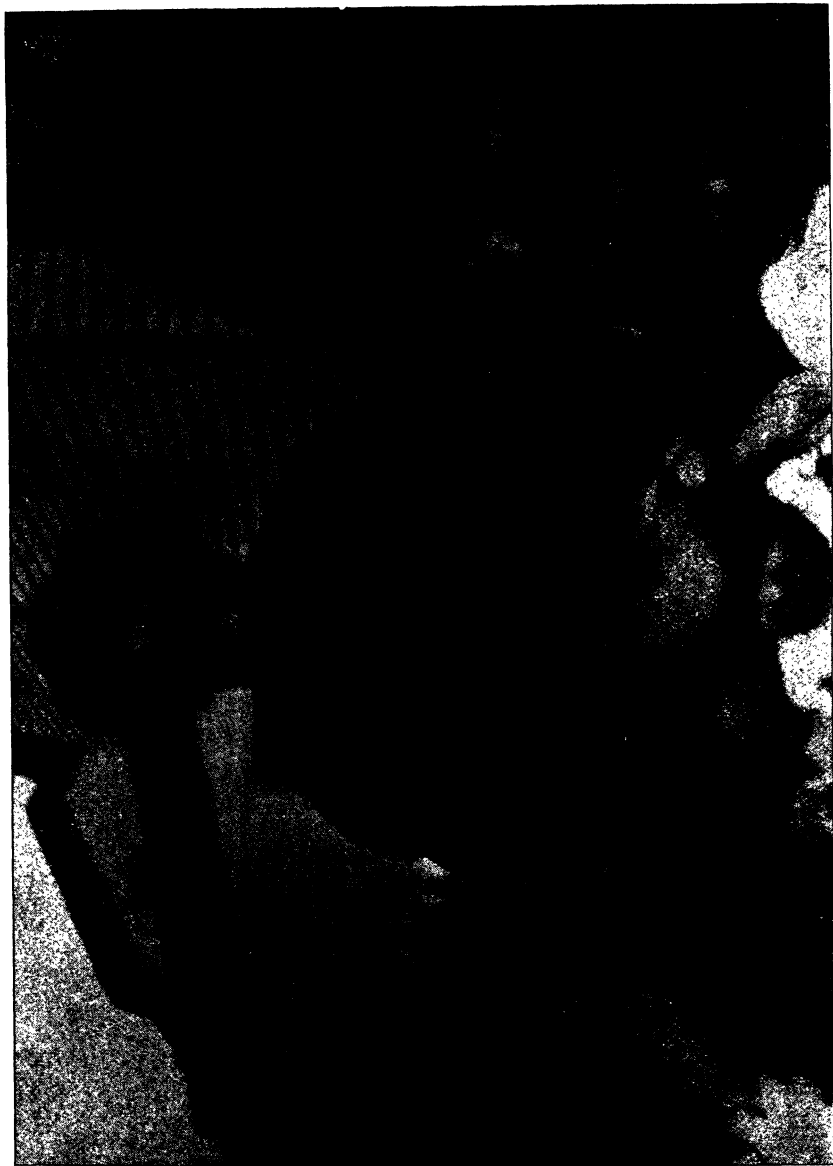
All machines that I inspected in the twine works were properly guarded; all "flyers" of the spinning machines are entirely shielded. Collapsible spindles have been substituted for all set spindles on balling machines, except on about thirty machines. This is done to assist the employees in removing balls from the spindles with safety. The company employs two men who are known as general safety inspectors, and who travel from plant to plant making recommendations as to safeguarding machines.

Noise:

There is considerable noise in the operation of the twine works. This noise can be heard several hundred feet away from the works, and in the spinning and balling rooms, it is very loud. This noise, however, is no greater than is commonly found in cotton, woolen and other spinning mills.

Light:

The basement is less than nine (9) feet from ceiling to floor. The width of the main floor is in some parts ninety (90) feet. The light falls through windows which are often covered by hemp dust. The northern part of the spinning room and the places where the balling machines are located, and also the north part of the basement are rather dark. Artificial lights must be used in these places during the daytime. Electricity is used for an artificial illuminant. All lights are provided with shades, and lights in the basement have been changed recently from 60-Watt to 100-Watt lamps. The rule which is gener-



CORDAGE COMPANY, AUBURN, N. Y.

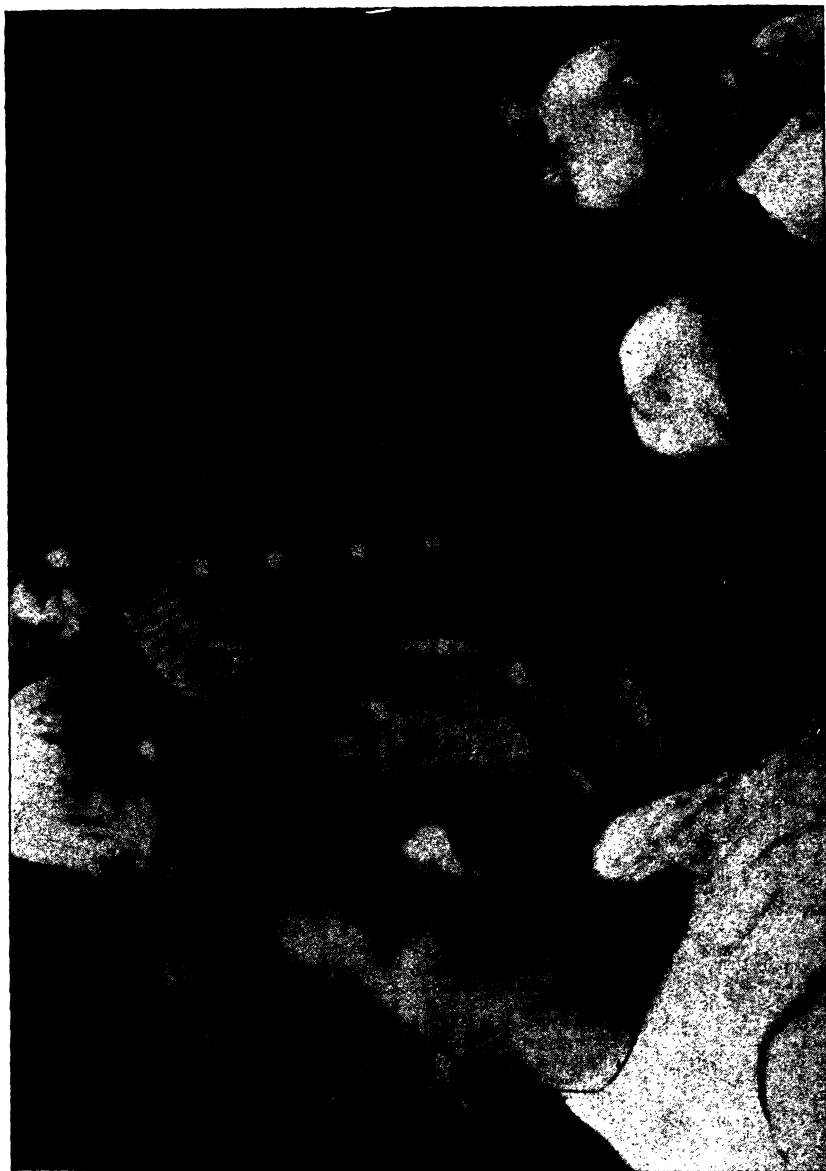
This woman is a widow who works five nights a week for less than \$7.00 in order to support herself and nine children.

A 5x5 grid of dots arranged in a diamond pattern. The top row has 1 dot, the second row has 2 dots, the third row has 3 dots, the fourth row has 2 dots, and the bottom row has 1 dot.

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CORDAGE COMPANY, AUBURN, N. Y.
Mother of four children who was a night-worker.

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ally followed in mills is to provide half-candle power per square foot of floor space, but in the case of the twine mills, this has been exceeded, and in the basement of the mill, there is approximately eight-tenths candle power per square foot of floor space.

Dust:

There is considerable dust in nearly all parts of the mill. This dust is caused by the nature of the raw product, hemp. It fills the preparing room where the hemp bales are opened and the hemp prepared by going through various breakers and spreaders. The dust in this department is so thick that the clothes and caps of the women are completely covered with it. Since the visit of the Factory Investigating Commission, the management has been endeavoring to make a contract with some parties who would guarantee to remove the dust from the mill with some dust-removing machines. A contract has been closed by the management with the Arlington & Curtis Company to install dust-removing apparatus for the various machines at a cost approximating \$10,000. I have seen the contract and a statement that the material will be on the premises within two weeks, and be completed within eight weeks from date. Within less than thirty days, the management has caused the changing of all windows so that they will lower from the top and be raised from the bottom. There are also draft boards in all the windows.

Seats:

Seats are provided for every woman operating machines in the balling department. This is a sliding seat, without back, attached to the work bench adjoining the balling machine. In the spinning department, there has always been one seat for every operator operating eight "flyers." At present, there has been provided two seats for each set of eight "flyers." In the preparation room, there is a seat provided near every machine.

Water, Washing Facilities, Lockers and Toilets:

Drinking water tanks, with inside jackets for ice containers, and sanitary drinking fountains of the bubble type, are provided throughout the plant.

In *No. 2 Spinning Room* a new locker room has been installed with eighty-five steel lockers, sixteen individual washbowls, sixteen looking glasses, sixteen holders supplying liquid soap, two rolls daily of paper towels, and two low benches for changing shoes, etc.

In the *Preparing Room* there are two men's toilets, four individual washbowls, ten closets and twenty-four steel lockers. Hot water is provided in working rooms.

The *Engine Room* toilet room is equipped with shower bath, individual washbowls, tub and closet.

The new locker room of the *Balling Department* is equipped with 120 double steel lockers, eight looking glasses, eight liquid soap holders, two paper towel holders. The toilet room for this department has four closets with modern plumbing. The locker room connected with the preparation room is equipped with seven closets, new type, seat flushing, cement floor, metal partitions and doors. All toilets are scrubbed daily.

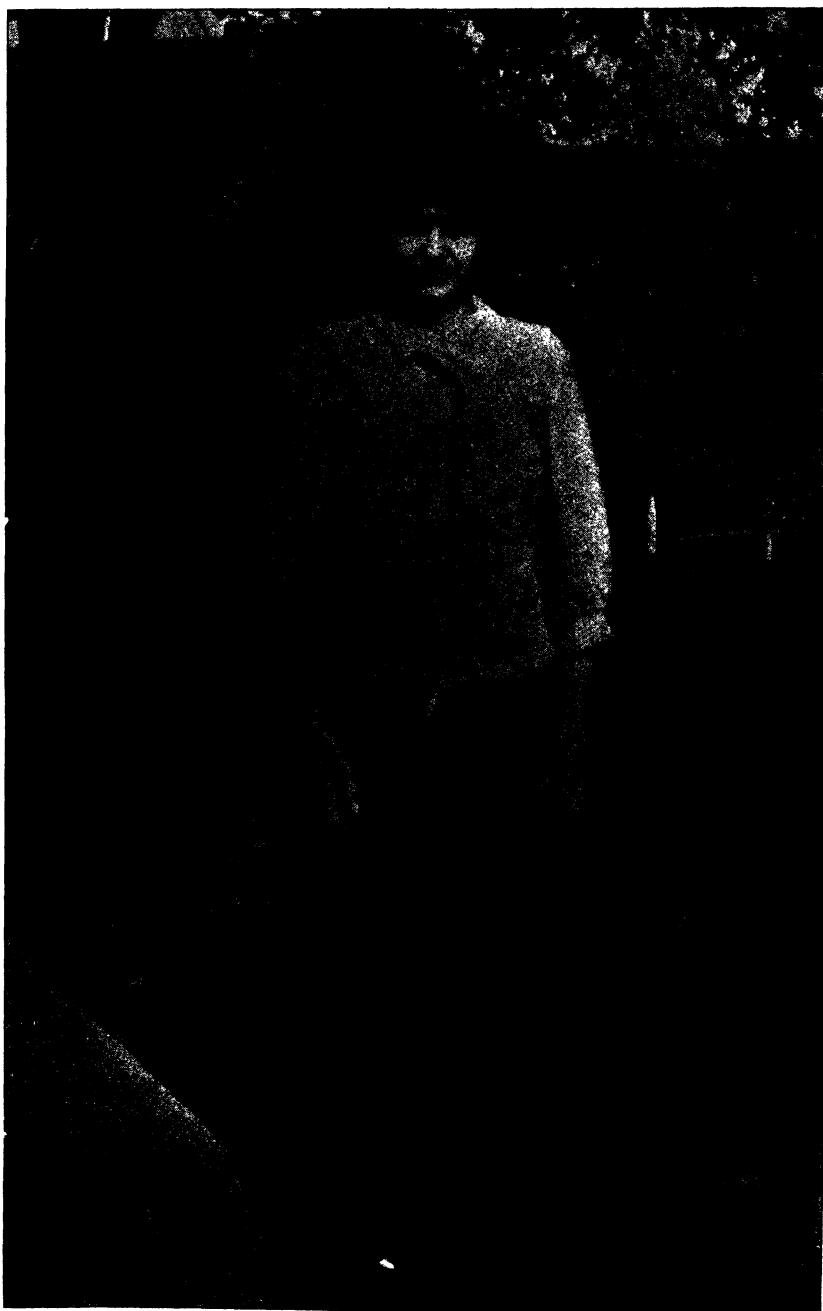
Rest and Lunch Rooms:

A rest room is provided in the basement. It is rather dark and badly ventilated. The management promises to change the location of the rest room to a better place and with better equipment.

A lunch room is provided in the basement. About half of the women and men use this lunch room. The other half go for their lunch to their homes which are in the immediate neighborhood. At the time of inspection, the lunch room, walls, ceiling, kitchen, tables, etc., were in a very clean condition. Coffee is served at the price of one cent per cup, sandwiches at two cents each, pie at three cents a cut, tea, fruit, biscuits, etc., at lower rates. The management claims that the sale of products in the lunch room is at about five per cent above the cost price.

Aprons and Caps:

Caps are provided to protect the hair of the women workers. These caps are made of straw-colored cambric. The management now proposes to furnish aprons also to the female employees, free of charge.



CORDAGE COMPANY, AUBURN, N. Y.
Nellie H——, Check No. 959.—This night-worker is a young mother.





CORDAGE COMPANY, AUBURN, N. Y.

This woman works at night and does her washing and all the rest of her house work when she should be sleeping.

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Heavy Work:

No women are allowed to pull bales of hemp, as heretofore. Special men workers are delegated to do this kind of work.

Accidents and Sickness:

A physician visits the mill regularly every day. Two matrons are employed, one by day and the other by night, whose duty it is to take care of the health and comfort of the women. These matrons also do ordinary first-aid work.

All employees belong to a benefit association. The management claims that belonging to the association is not compulsory, although all of the employees are members. Employees are examined by a physician as soon as they are employed. In the examination of female employees, the matron is always present. A physician visits the mill two or three times a week during the night.

All accidents are reported to the foreman, to the matrons, to the superintendent, and the inspector of safety. The state law, with regard to the employment of women before and after childbirth, is being adhered to strictly.

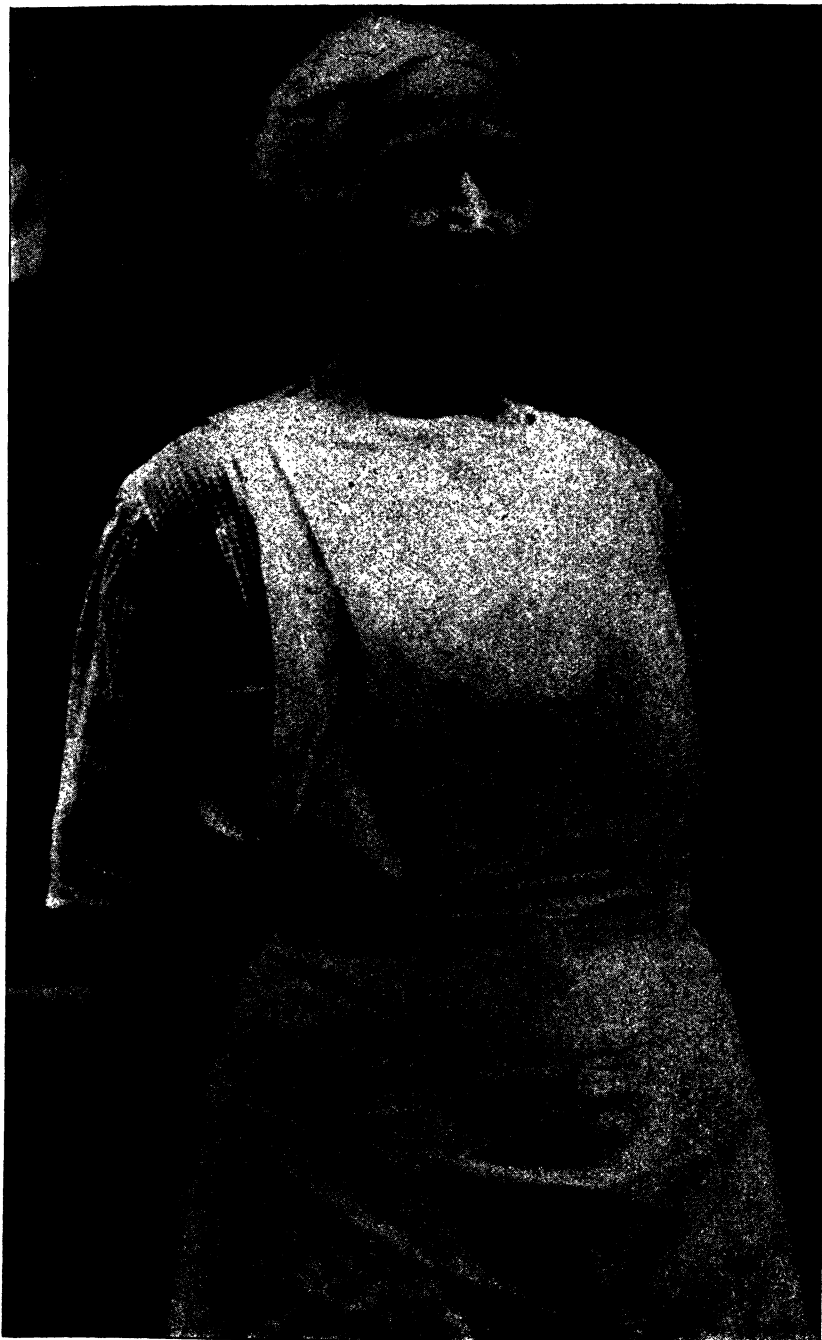
III.

In order to make a more thorough investigation of the condition of the women night workers in this establishment, two investigators, Miss Grace Potter and Miss Gertrude E. Smith, were sent to the city where the establishment is located. These investigators have visited the works a number of times during the day, and frequently at night, have held conversations with the women night workers, and have taken the personal histories of one hundred of them. Most of the work of taking the histories was done by Miss Smith, with the assistance of Miss Potter, who also took photographs.

The following is an example of the history schedule which was given to the investigators to be filled out:

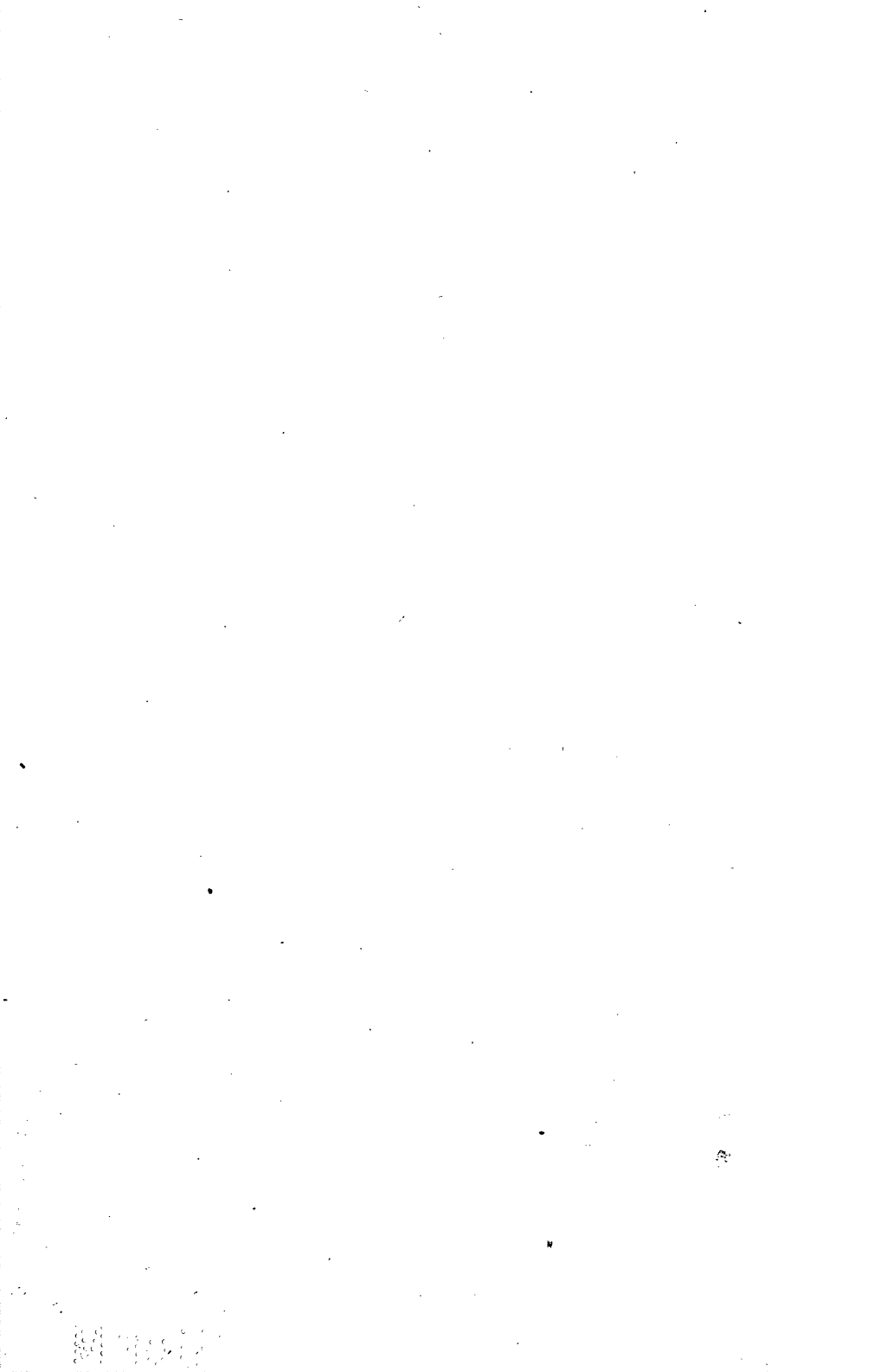
Name;
Street and number;
Nationality;

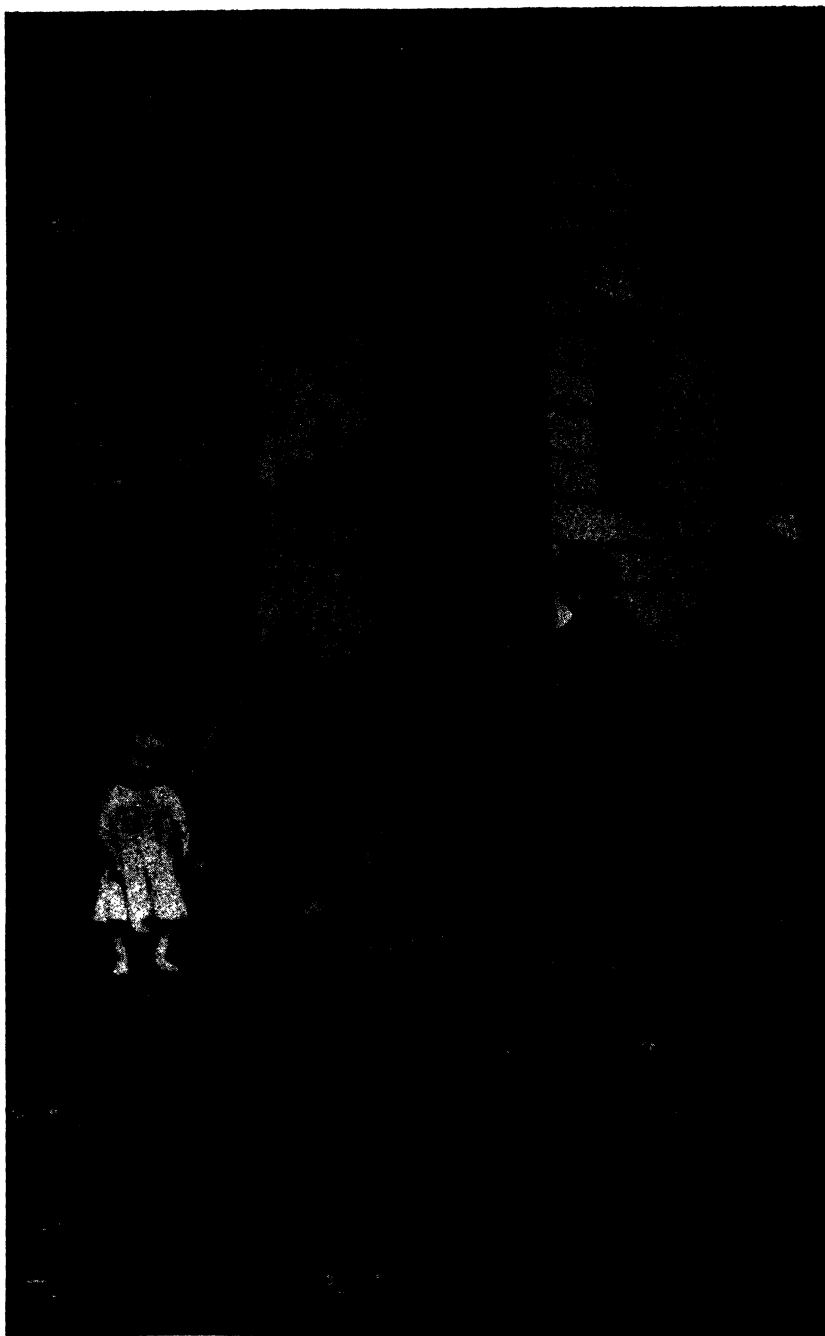
How long in the United States;
Age;
Single, married, widowed;
Children living;
Ages;
Children dead;
Ages;
Number of pregnancies since working;
Number of children born since working;
Doctor;
Midwife;
Time loss at each birth;
History of abortions;
Time loss at each abortion;
Apparent weight;
Apparent height;
Apparent anaemia;
Headache;
Backache;
Periods;
How long at work;
Nature of work;
 Sitting;
 Standing;
 Carrying;
Hours of work;
 Nightly;
 Weekly;
 Monthly;
Piece;
Time;
Presence of dust;
Presence of noise;
Temperature;
Number of accidents;
History of accidents;
Time spent at lunch;
Food;



CORDAGE COMPANY, AUBURN, N. Y.
Mrs. P——, the oldest worker in the twine shop, now doing night-work.

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CORDAGE COMPANY, AUBURN, N. Y.

When mother works nights at the company the little ones learn to keep quiet out doors while she is sleeping in the day time.

2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



Where eaten;
 Wages;
 Distance between factory and home;
 Walk or ride to and from work;
 Who prepares breakfast;
 Who prepares dinner;
 Who prepares supper;
 Who does housework;
 Who does washing;
 Hours of sleep;
 Where does she sleep;
 Where husband works;
 What he does;
 Hours;
 Wages;
 Health;
 Number of children working;
 Earnings of each child;
 Combined earnings of family;
 Daily;
 Weekly;
 Monthly;
 Reasons for working;
 Remarks;

ANALYSIS OF THE HISTORIES OF 100 WOMEN NIGHT WORKERS.

(1) *Nationality:*

Of the one hundred cases investigated, 95 were Polish, 3 were Ruthenians, and 2 Irish-American.

(2) *Length of Time in the United States:*

Two were born in the United States, 2 had lived here less than 22 years, 4 less than 19 years, 11 less than 14 years, 51 less than 9 years, 25 less than 4 years, and 5 less than 1 year.

(3) *Ages:*

One was over 55; 3 under 20; 17 between 30-40; 80 between 20-30.

(4) *Conjugal Condition:*

Seventy-seven were married, 18 were single, and 5 widowed.

(5) *Children:*

There was 97 babies whose mothers were doing night work. Of the 82 (married or widowed) night workers, 75 had children. One woman had 11; 22 had but 1.

(6) *Ages of Children:*

Eight were over 15, 15 over 10, 43 over 5, 73 over 1, and 24 less than 1 year old.

(7) *Pregnancies:*

Two children have been born since night work began this year. Eight women were pregnant at the time of the investigation; no history of abortions.

(8) *Morbidity:*

The average weight for 90 per cent of those questioned was between 125 and 135 pounds; 62 were anaemic, 57 complained of backache, 53 of headache. Menstruation regular in 76 cases, 24 not regular (8 pregnant); 10 had nursing babies.

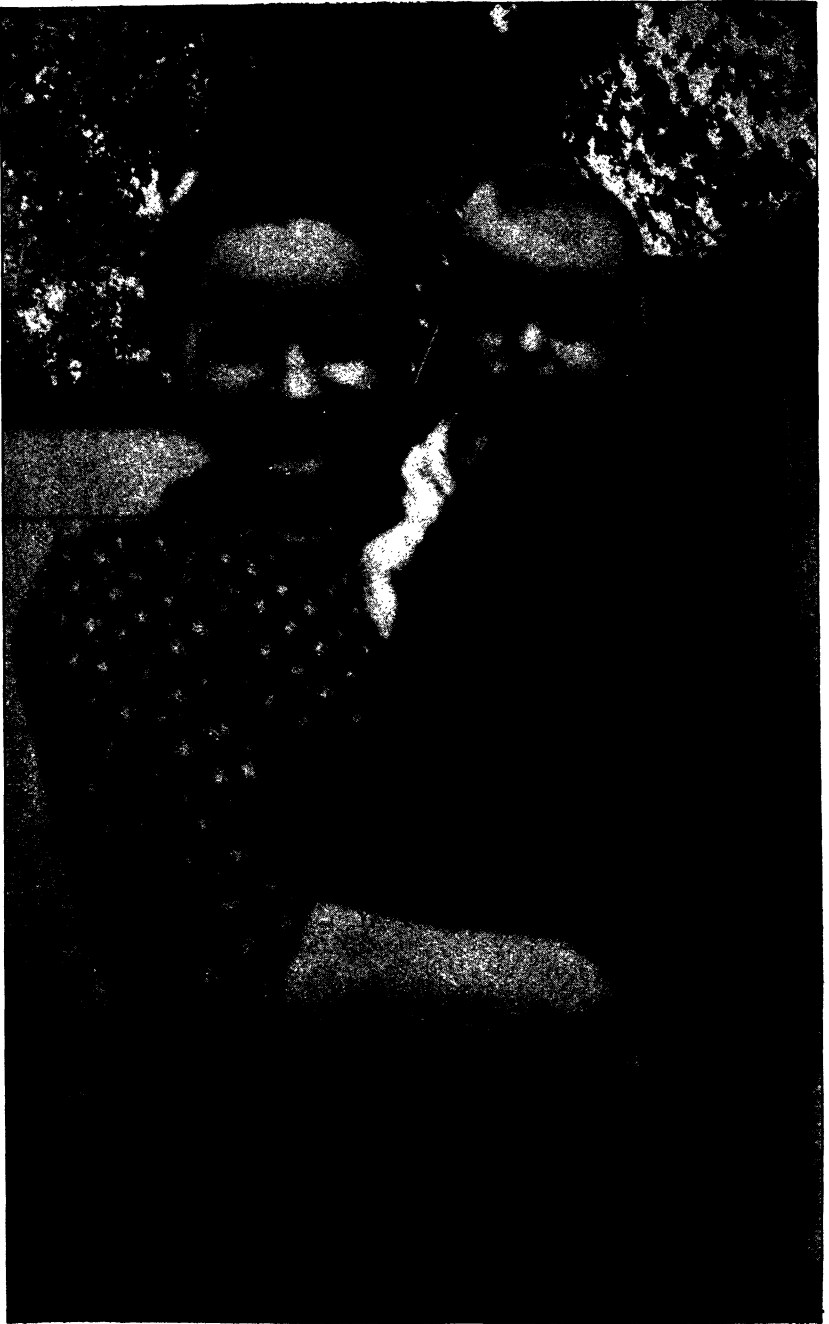
(9) *Nature of Work:*

All operatives worked standing; 48 of the women worked in the spinning room, 30 in the balling, 22 in the preparation room, and as inspectors and instructors.

All of those examined stated that the workrooms were dusty, and, with the exception of 7 or 8, they characterized the temperature as "hot." The total number of accidents from December, 1911, to July, 1912, was 22.

(10) *Night Lunch Period:*

When the investigators first visited the place of work they found that as the machinery was left running the women took just enough time at midnight to hurriedly swallow a little food, or, as they expressed it, "time to drink a cup of coffee." At present the operatives are granted a half-hour period for midnight lunch. This was a new order issued after the investigation by the Commission, according to the statement of 95 per



CORDAGE COMPANY, AUBURN, N. Y.

A night-worker photographed on the street about 8 a. m. with her two children.

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CORDAGE COMPANY, AUBURN, N. Y.
Victoria B——, Check No. 1083.—“Has backache so she can't sleep
sometimes.”

1000

cent of the workers. The food consists of coffee and sandwiches, or coffee and cookies. About 10 per cent of the number said they brought their night lunch with them; the rest bought cookies and sandwiches at the lunch room counter. In all cases food is eaten in the regular lunch room.

(11) *Hours of Sleep:*

The women with families averaged about 4½ hours sleep a day. The hours of sleep varied with the individual. Some slept an hour or two in the morning and for a time in the afternoon; others slept at intervals of about an hour each during the day. They all slept in bedrooms which had been occupied during the night by husband and children.

(12) *Wages:*

One received \$12 a week, 6 from \$9 to \$10 a week, 28 from \$8 to \$8.99, 32 \$7 to \$7.99, 11 \$6 to \$6.99, 23 received a varying wage, so that an average could not well be fixed.

(13) *Work in the Home:*

All the women with families did their own housework; they prepared three meals a day, including breakfast, after a night's work. They also did the washing for the family.

(14) *Reasons for Working, and Remarks:*

When questioned about their reasons for working, the usual reply was, "To help take care of my family," "To save money to buy a home," and "To dress my children right."

No. 2. S. S—— says: "But the standing is so hard. If we only had five minutes to sit down; but the machine keeps going and the hemp piles up, so we can't think of sitting down."

No. 4. Mrs. C. S—— and her children, pasty, pale and sick-looking: "Mother left her work in the spring because baby was sick. She wants to stay home all the time and care for her babies, but she must get back to work soon. They can get along without care, but they have to have food."

No. 5. When Mrs. P—— was widowed she tried washing, and it was too hard, so she went to the factory. She put the two older children in an orphan asylum, where she supplied

their clothes, but did not pay board. When they were 13 years old she took them out. She says people in Poland do not have to work so hard to make a living. They live till they are very old there. "Here we are old when we are young." Says she is the oldest woman working in factory and has worked there longest.

No. 6. N. W—— is working to get money to go to house-keeping or back to the old country. Wants to work at night on account of her baby which she is nursing. She is sweet-natured and intelligent.

No. 9. R. F—— works because she needs the money. She asked to do night work on account of child. She is exceptionally intelligent.

No. 12. The health of R. S.'s husband is poor. She worked to make it easier for him. Found the work too hard and left after working four months. This woman is intelligent and willing to talk about work, which she says is too hard for "any woman that ain't a horse."

No. 16. A. C——, single, has asked twice to be given day work. Was told she must "work nights" if she worked at all.

No. 17. N. D—— worked at night so as to leave baby with husband. She has bought two work knives (10 cents apiece).

No. 20. K. W—— works irregularly. She works at night so as not to have to pay for having child taken care of during day.

No. 21. N. T—— wants to work at night so as to care for house during day and take care of children. Investigator asked how long she intended to work, being pregnant. Replied: "Oh, I'll be all right in a day or two." Would not explain further.

No. 23. R. M—— has no children. She thinks she ought to earn money while young. Had rather work at night, as time goes quicker working five nights a week. Thinks day work harder.

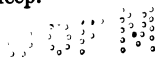
No. 24. M. L—— would rather work days, but can't get any one to ask for her. Is unable to speak any English.

No. 25. A. K——'s eyes bother her since working. "They feel sore," she says. Has bought six knives since working nights



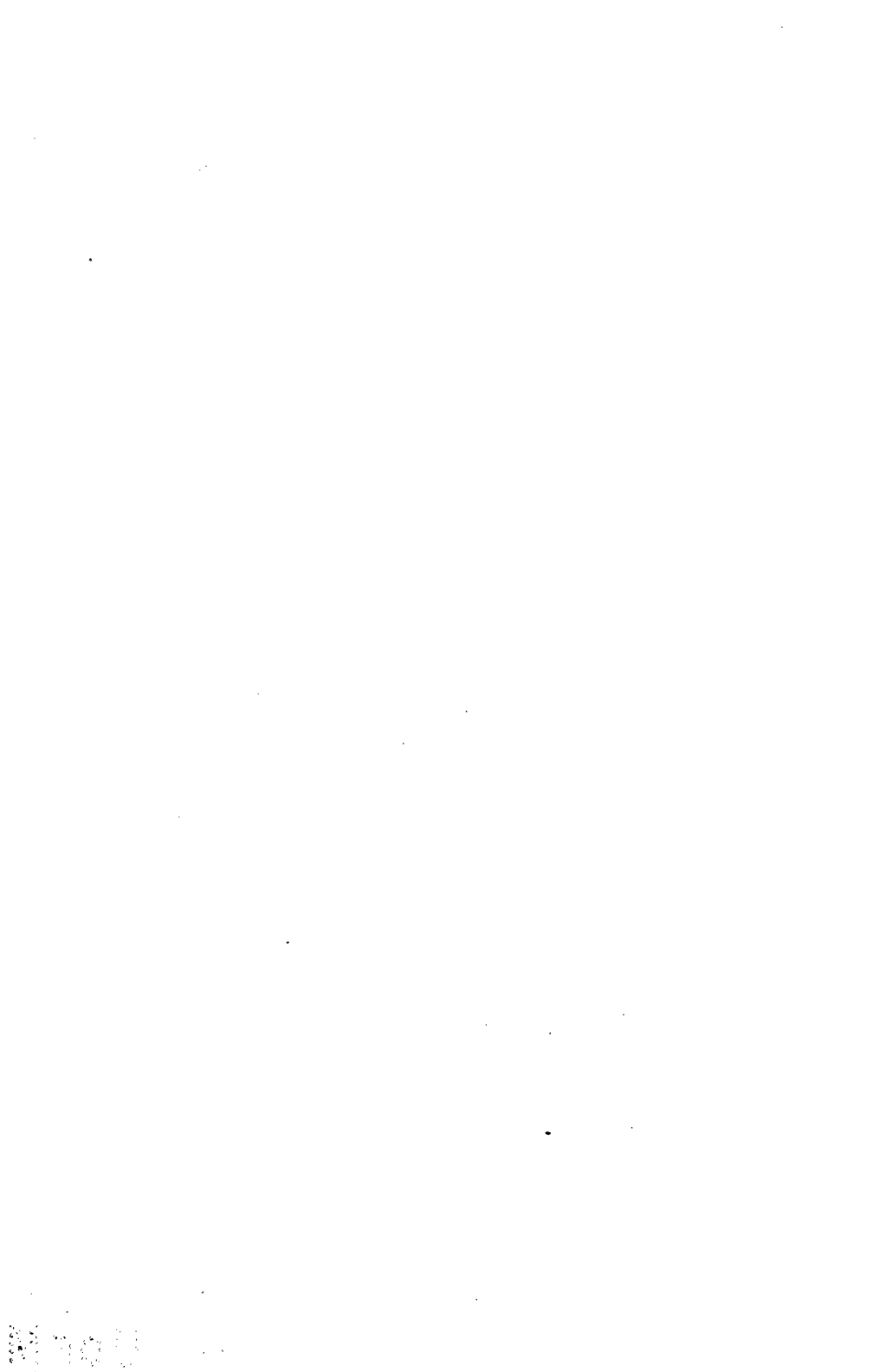
CORDAGE COMPANY, AUBURN, N. Y.

The smaller boy in the picture walked too soon and will always be bow-legged. His mother is a night-worker and when she isn't busy with the cooking, cleaning or washing in the day time, she has to sleep.





CORDAGE COMPANY, AUBURN, N. Y.
Children of factory workers on the street.



(at 10 cents each). Some "stolen," some "broken," and one "lost."

No. 28. K. M—— doesn't care whether she works nights or days; was told to do night work. Has had five knives since working.

No. 35. J. K——'s husband was out of work six months, therefore "she had to make money." Would rather work nights. Bought two work knives since December, 1911.

No. 45. S. G—— wants to do night work on account of children, as she would have to pay to have them looked after during day. Home destitute in appearance.

No. 47. N. D—— wants to do night work on account of baby. Has boarders now who pay \$3 a month for room and washing.

No. 51. M. B—— would rather do day work, but "boss" told her she must work at night.

No. 52. C. G—— didn't have a good machine, so asked for night work, thinking she would get a better machine. Girl was asleep when investigator called. She was covered with flies and was lying on a dirty bed in front room of house in which there was a sewing machine that a woman was running. This did not seem to disturb the girl in the least — nor the flies.

No. 53. S. G—— didn't want to do night work, but was told she must transfer from day work or she would lose her job. She would like to get back to day work. She didn't use to get so tired when she did day work. "But a girl must mind the boss."

No. 55. V. B—— says: "I want to work nights so I can be home with the children in the day. If I didn't work in the factory I should have to work in a hotel two or three days a week."

No. 56. N. T—— hopes her husband will get well so she can stay at home. "He was well and strong when he began to work at the factory; he weighed 180 pounds. Worked one year; then sick; weighs now 130 pounds." She is nursing her baby now, and would rather work at night so that she can feed the baby in the daytime.

No. 57. M. S—— hadn't enough money to stay at home and not work. When she cut part of her finger off she went to the office after the wound was healed and asked them to pay for the loss. "We only pay for the whole of a finger being cut off," they told her. They then paid her \$16.38 for the loss of her time — five weeks. The finger is always sore and hurts her whenever the wounded end touches anything. "It seems as if they should pay me for that finger because I suffered so, and it hurts me yet and is not strong."

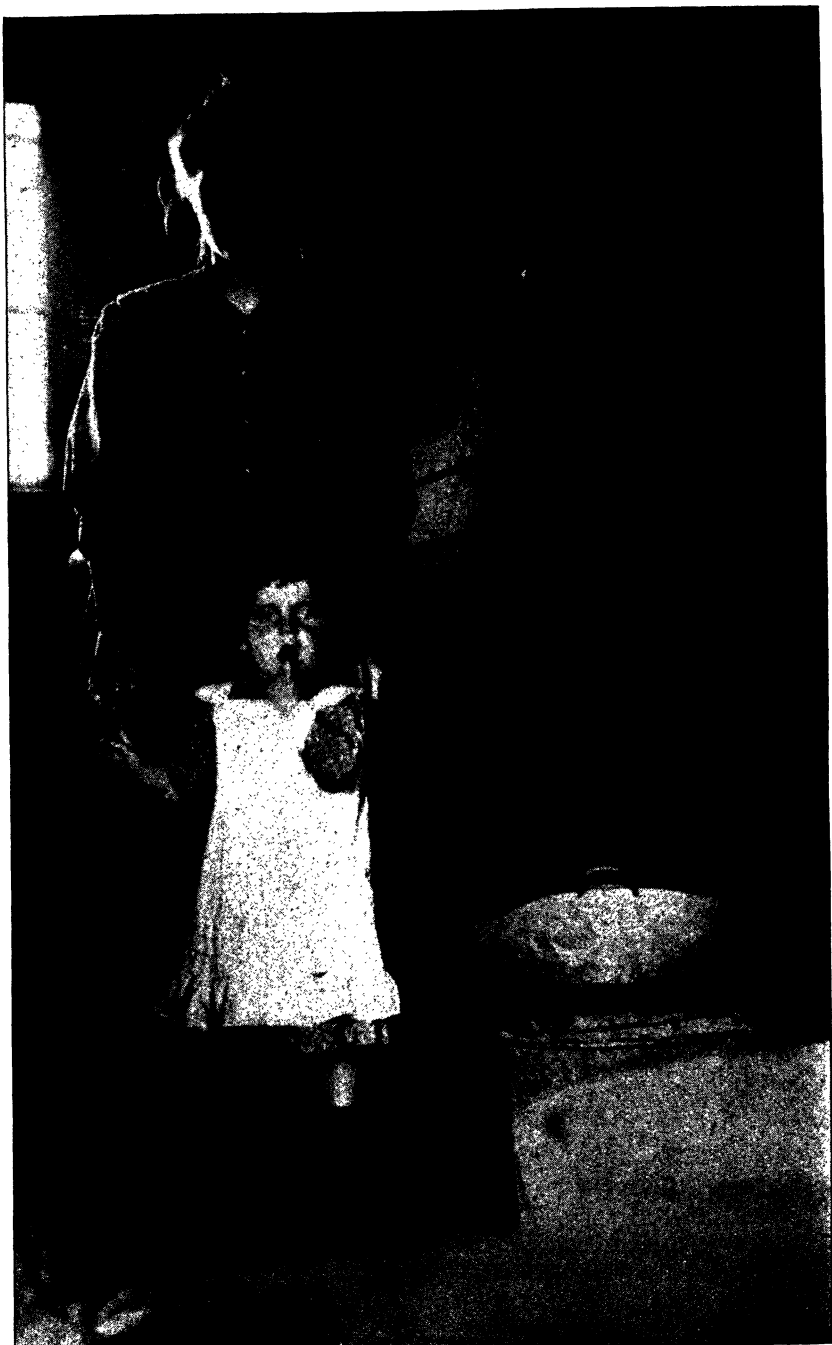
No. 61. S. C—— says: "I wanted to work days instead of nights, but when I asked the boss to change me he said, 'If you don't want to work nights, go home. You'll get no job days.'" When the present pregnancy was discovered she was told to go home to take care of her health. Will go back to factory again when her baby is born.

No. 62. A. S—— would rather do day work at the factory, but says she must work in her house during the daytime.

No. 65. Girl working to support herself. Used to do housework in Poland and found it much easier than factory work. She came here because she heard she could get good work. "If I can save money enough and God will let me, some day I shall go back to Poland."

No. 66. M. R—— works to support her family, to buy shoes for her baby and food. "I am strong and healthy, and I am glad to work and take care of my children. Else what would become of them? Don't stop the night work with troubling the foreman. They might shut down, and then " (she pointed to the little girl) "she will have nothing to eat and nothing to wear. I don't want to have to go to work days, as then my children are alone." The boss had warned the girls that "their wages are going to be cut down to \$5 if they talk to the investigators." This woman was fearful of telling how bad things were.

No. 68. Girl works to help support herself and pay expenses of brother who is studying for the priesthood. Would just as soon work at night as day. She likes the long rest from Saturday morning to Monday night.



CORDAGE COMPANY, AUBURN, N. Y.

Mary R——, 32 years old, looks 50.—This picture was taken early Saturday morning when she had just finished dressing and bathing her little girl.

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CORDAGE COMPANY, AUBURN, N. Y.

Katie and Mary S.— (sisters), Check No. 1033.— Are both night-workers; Mary lost part of the index finger of her left hand, as will be seen in the photograph, while working on a machine in the "preparation room," where the hemp is straightened out.

No. 69. Mrs. M. N—— can't support her family on what her husband makes. "You can't feed and clothe a lot of children on what a man makes any more." She changed from night to day work because it took all her strength to stay up all day beside. Now, working days, she gets up and dresses and cares for all the children before she goes to work. Children were ragged and tattered and sickly.

No. 71. Woman works because husband has been sick one year in hospital. Woman asked to do day work, but was told to "go home" if she couldn't work at night.

No. 72. This woman works because she "has nothing else to do." Wishes she had children. Would rather work days, but knows "boss" wouldn't let her if she asked.

No. 74. N. M—— says: "I would rather work days if I could leave my baby with some one. I burn up my pay envelopes; my pay is so small I am ashamed."

No. 75. Woman says she doesn't like night work; it was too hard. "Quit" three weeks ago. "I used to be cross to my children when I worked nights because I was so tired all the time."

No. 77. J. C——, 26 years old; looks like a girl of 18 years. She is refined and bright. Says she would like children. House had the appearance of an American home.

No. 78. J. F—— says: "I have to work nights to make more money and be home days to take care of my baby." Has bought three work knives — all of them were broken.

No. 80. This woman says friend would take care of her children, but knows "boss" wouldn't let her do day work if she asked him.

No. 81. "I can't live on my husband's salary of \$16 for two weeks. I have to work nights to keep my children and home in the day."

No. 82. Woman's baby was not quite two months old when she began night work six weeks ago. She says her husband's pay is not enough to keep family.

No. 84. M. U—— is a widow, and works to support herself and large family. She lives upstairs in four small rooms, which are destitute of furnishings and dirty. Three of her children are in the old country. Her oldest child, a girl, is here. She is undersized for a girl of 16 and cannot get working papers. The only support of the family is the woman, who has worked every night for three months (losing only about six nights), and a boarder who pays \$4 a month for a room.

No. 85. Woman comes home "almost dead." She has to walk so far and she feels so tired anyway. Car not running as early as 5.30 A. M. Wants to work at night on account of children. Woman had just finished large washing; five lines of clothes were counted.

No. 86. Woman works at night, as she has no one to leave her children with during day. Sometimes feels exhausted when she comes home in the morning.

No. 88. "I thought it would be easier to work nights, but I couldn't stand it, and I stopped work two months ago." Asked whether she took thirteen machines of her own accord, she said "No. Foreman gave us all thirteen machines apiece."

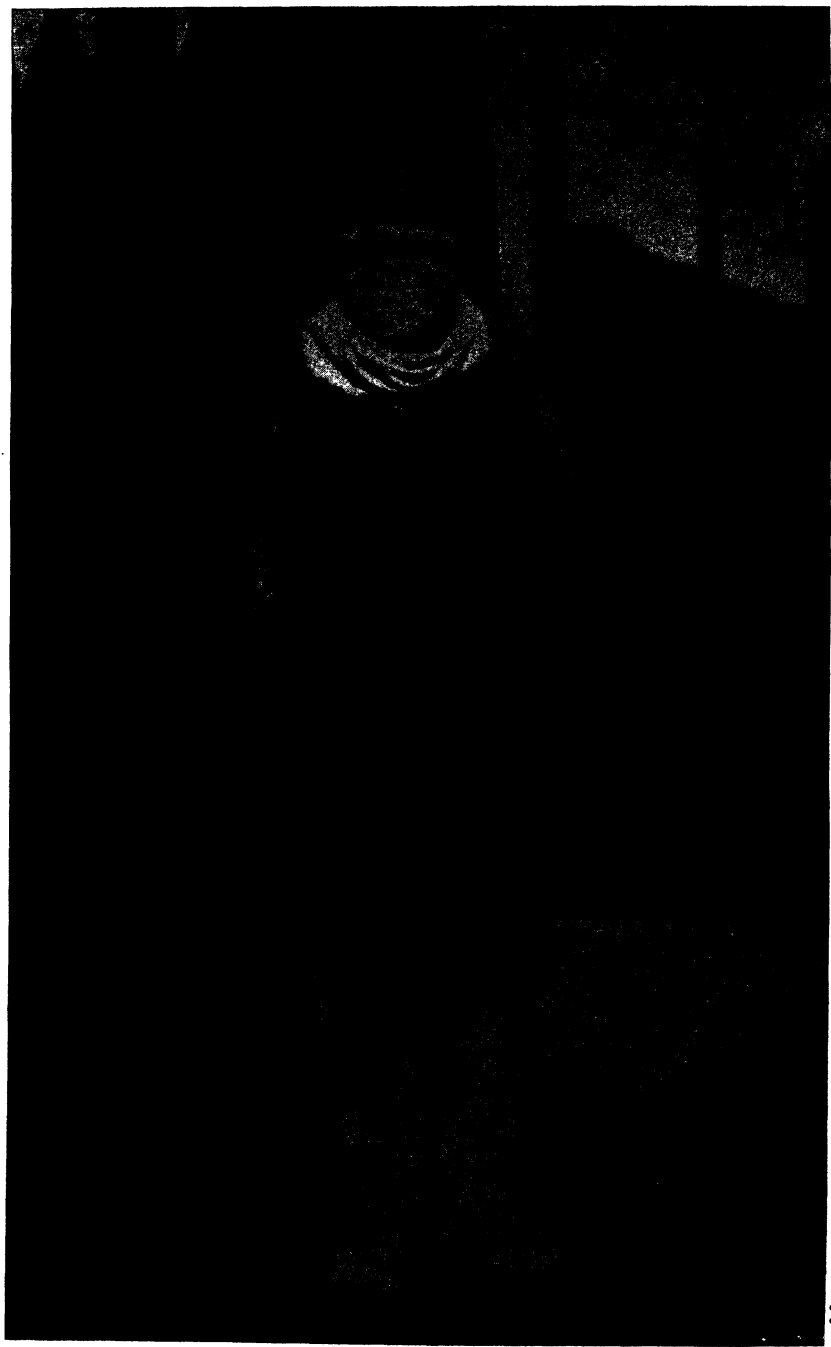
No. 92. Woman, doing dressmaking now, stopped work in factory because she found it too hard. She says: "My feet bothered me so I had to wear felt slippers. They ached because I had to walk so carefully on slippery floors."

No. 93. "I come home so tired; if I sit down I fall asleep."

No. 94. "I wanted to work nights on account of my child. I found the work too hard. It strained my back and hurt my side pulling hemp piles, and I stopped on that account."

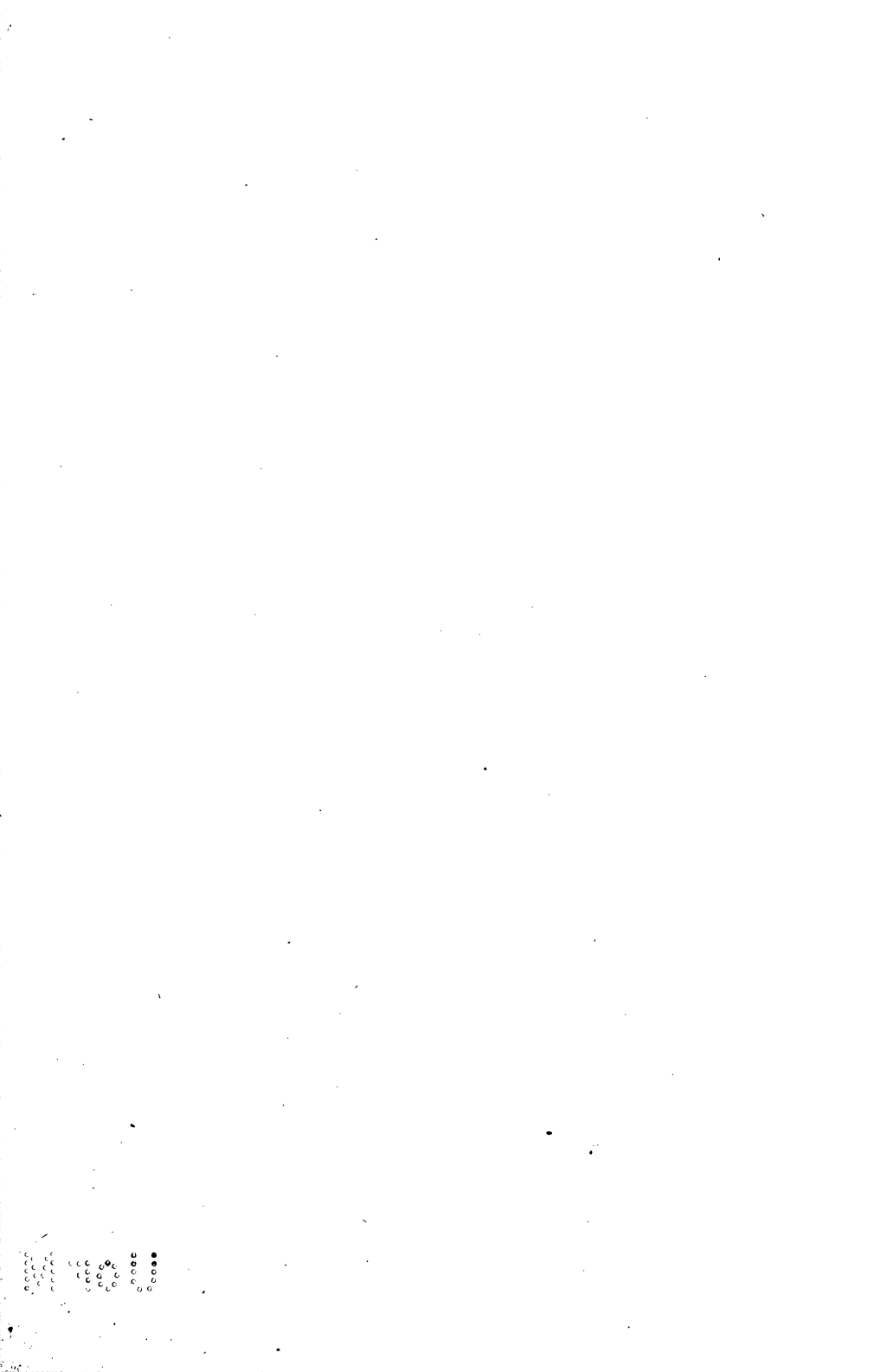
No. 96. "I want to work nights so I can take care of my children in the day. Why ain't men's pay more so women wouldn't have to work? I spent lots of money on my eyes; the dust makes them sore. It's hard to work nights, but you got to live."

No. 99. Girl who had done day work for four years was told to do night work. She said that she "didn't mind." Thought she would get more machines at night. Says she likes it at night because there ain't so many people around.



PLANT B, NIAGARA FALLS, N. Y.

Packer of "bleach" or chloride of lime.—Wears several thicknesses of moistened white flannel over his mouth and draws breath only through this.





PLANT P, NIAGARA FALLS, N. Y.
P. M—; burns from hot mixture of lime and soda.

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CHAPTER IV

THE CHEMICAL INDUSTRIES.

I.

There is no industry in which such prodigious strides have been made in so short a time, in which the revolutionary changes have been so rapid, in which greater secrets have been wrested from nature, or in which such vast wealth has been accumulated within so incredibly short a period as in the chemical industry.

No less remarkable is the rapid growth in the development of the industry. Within the last decade it has enormously expanded and increased, so that percentages based on a comparatively recent table show the value of its products to be 28 per cent of all the products of all the industries in the United States, the number of wage-earners 17 per cent and the wages paid to them 19 per cent. (1)

In no other industry are perils to the body and dangers to the health of the workers so many, so insidious and so deadly. The workers come in direct, close and daily contact with lead, arsenic, phosphorus, antimony, mercury, chromium compounds and other powerful poisons. Injurious gases and harmful fumes are evolved in hundreds of its various processes. Irritating dusts, excessively high temperatures, burning and spurting liquids, dangerous explosives and many other open and hidden, seen and unseen dangers lurk at almost every step.

And yet, here in the United States, there is no industry in which there is less protection to the health and interests of the workers, or where a standard for ever-increasing production and large profits is maintained at such a sacrifice of human life.

Abroad the chemical industry is more carefully regulated than any other. Many special legislative enactments for the control of working conditions in the industry have been passed with the purpose of preserving the lives of the workers. The United States is just awakening to the dangers of this great industry. By act of Congress one of the most dangerous poisons, yellow phosphorus, has been eliminated from this trade. Doubtless with the further awakening of the public conscience we shall realize more clearly that industrial progress is impossible without industrial justice.

(1) Transactions of Am. Inst. of Chem. Engineers, Vol. II, 87 — Prof. C. E. Monroe.

II.

GROWTH AND IMPORTANCE OF CHEMICAL INDUSTRIES.

By "industrial chemistry" is understood chemical production in which materials undergo an essential change due to a rearrangement of their integral or ultimate particles. Such changes are brought about by what is called chemical energy, in contradistinction to mechanical energy, which affects the physical relations of matter so as to alter the dimension, form, etc.

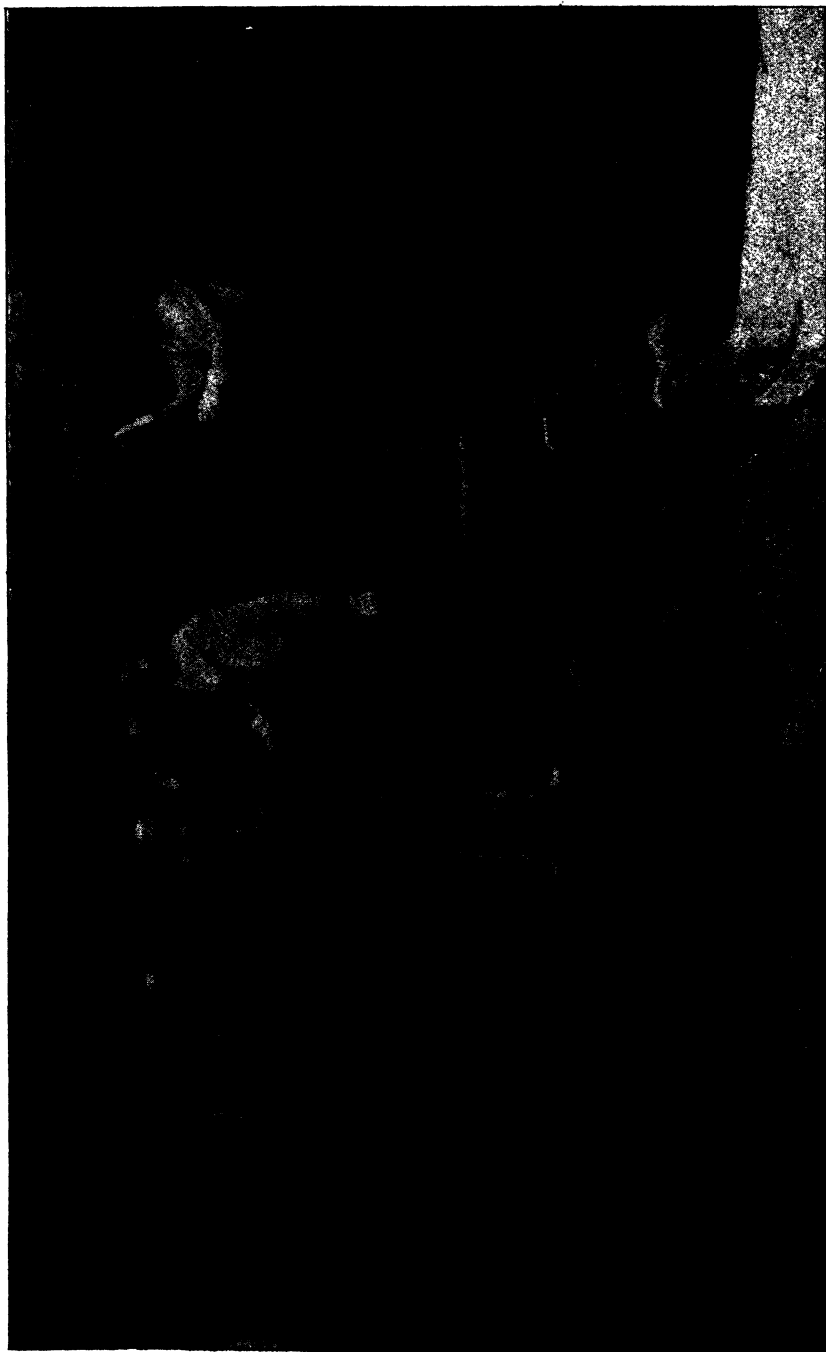
The range of the chemical industry is therefore much wider than is popularly supposed, and includes among its manufactures the making of acids, alkalies, drugs, dyes and related compounds. Technically, chemical manufactures include also the smelting and refining of metals, the manufacture of coke, glass, cement, rubber, glucose, chemical pulp fiber, fermented and distilled liquors, starch and sugar, the finishing of textiles, tanning of leather, and many other processes of industrial activity.

The United States Census of Manufactures for 1910 includes under the heading of chemical and allied products some twenty-five or twenty-six separate industries, from the manufacture of axle grease, baking and yeast powders, explosives and fertilizers to the manufacture of salt, soap, starch and wood distillates.

Using the term "chemical industries," as given by the United States Census of Manufactures, the following table shows the growth of the industry, and its extent:

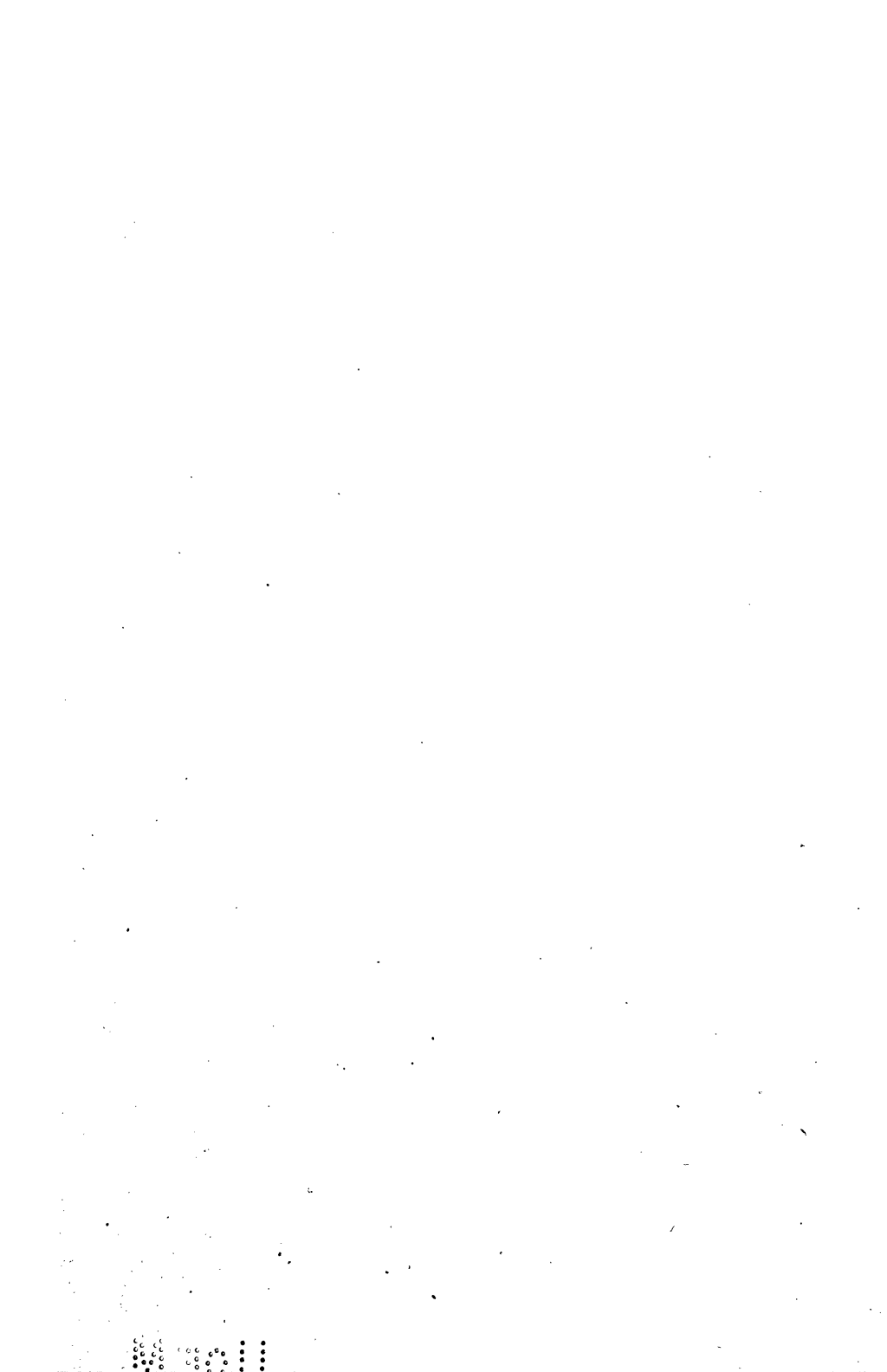
TABLE NO. XIV.
MANUFACTURE OF CHEMICALS AND ALLIED PRODUCTS AS PER CENSUS OF 1910, 1905, 1900

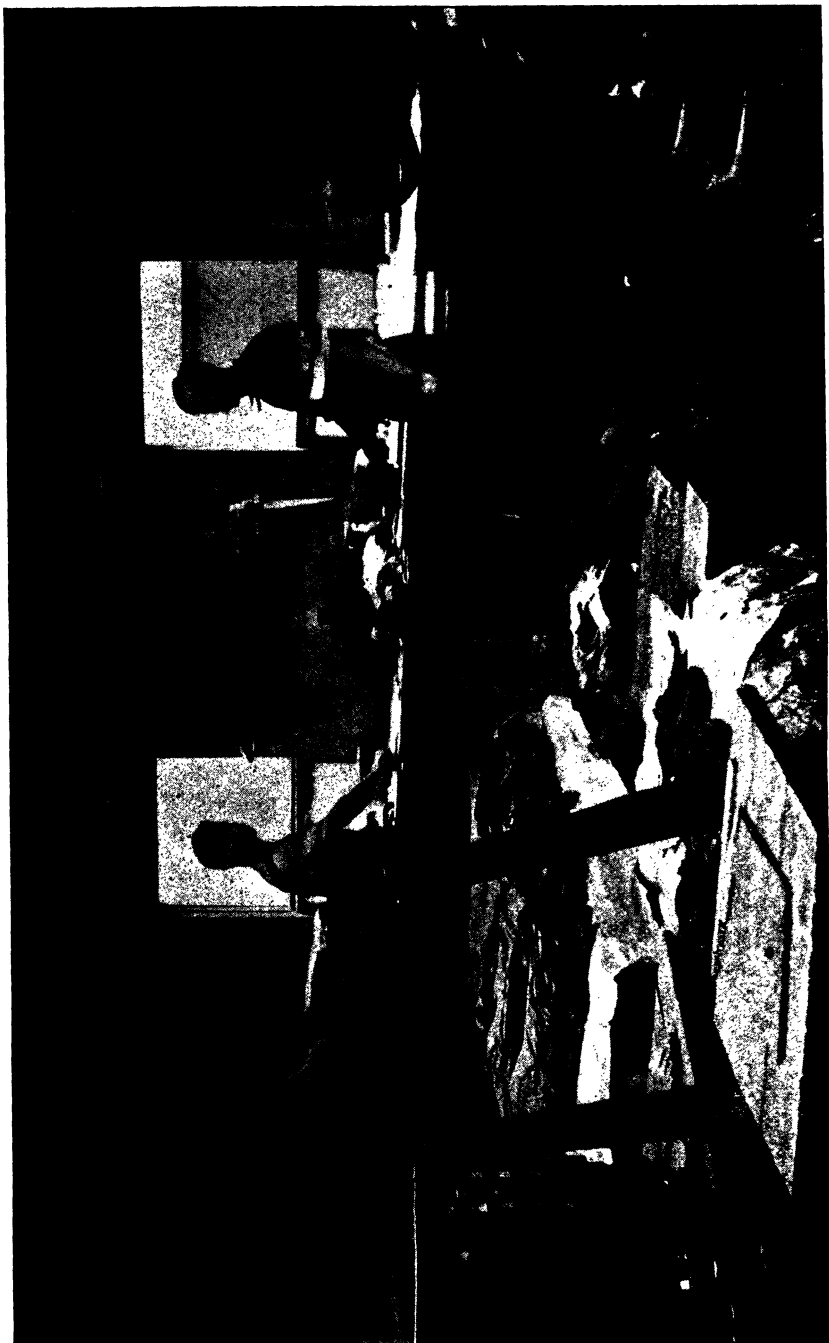
	1910	1905	1900
Number of establishments.....	11,863	9,689	8,820
Wage earners (average number).....	242,961	213,041	185,515
Women, 16 years and over.....		20,549	
Children under 16 years.....		1,807	
Salaried officers, managers, etc.....	68,576	45,442	34,564
Total salaries.....	\$81,037,000	\$50,252,490	\$37,253,191
Total wages.....	116,214,000	95,739,828	73,349,687
Cost of raw material.....	\$903,920,000	\$629,609,182	\$453,410,783
Value of products.....	1,479,700,000	1,056,532,195	757,126,198
Capital invested.....	2,053,970,000	1,521,773,823	1,180,104,447
Miscellaneous expenses.....		129,886,541	74,254,785



WIRE CABLE MANUFACTURING, BROOKLYN, N. Y.

The three vats almost level with the floor contain sulphuric acid and scalding hot water used for cleaning wire; they are entirely unguarded.





FUR DYERS, EAST FORTY-EIGHTH STREET, NEW YORK.

Bleaching furs with ammonia.— Work is very irritating to the throat and eyes; no duct in this room to carry off fumes.

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III.

INVESTIGATIONS OF THE CHEMICAL INDUSTRIES.

The chemical industry as a separate industry has never been especially investigated, although separate branches of it have from time to time been investigated as a part of inquiries into dangerous trades.

In the reports of the various investigations which were made in Great Britain in 1815, and which were continued in 1835, 1864, etc., references were made to the chemical trades. Special legislation pertaining to chemical trades was enacted in 1860 and 1863 in the Bleach Dye Works Act. In 1864 the following industries were placed under the Factory Regulation Act: the manufacture of earthenware, lucifer matches, percussion caps in cartridges, and paper staining. On August 4, 1906, the Secretary of State for the Home Department appointed a committee to inquire as to what injuries, other than injuries by accident, are due to industrial occupations. The committee had forty-one sittings, the evidence of 159 witnesses was taken, ninety-two of whom belonged to the medical profession. On May 15, 1907, the committee submitted its report. A large number of industries, most of them belonging to the chemical group, were included under the Compensation Act. The investigation resulted in the act of 1907, which is quite comprehensive. It includes the various chemical industries in its legislation upon dangerous trades.

In 1810 the French government issued a decree relating to establishments "*dangereux, insalubres et incommodes*;" in 1839 the "*Academie des sciences morales et politiques*" directed an investigation of the dangerous trades, including the chemical trades.

In Germany certain chemical industries have been investigated by the various component states. These investigations began in 1859, and since that time there has been special legislation on dangerous trades.

In the United States the only extensive investigation of the dangerous trades was made in the State of Illinois by the Occupational Diseases Commission, created in 1907. A large number

of dangerous trades were investigated by this Commission, and its report issued in June, 1911, is a very valuable document.

An investigation of the chemical trades was made by inspectors of the State Board of Health of Massachusetts eight years ago. The report of 1907 includes some important findings of the investigations made.

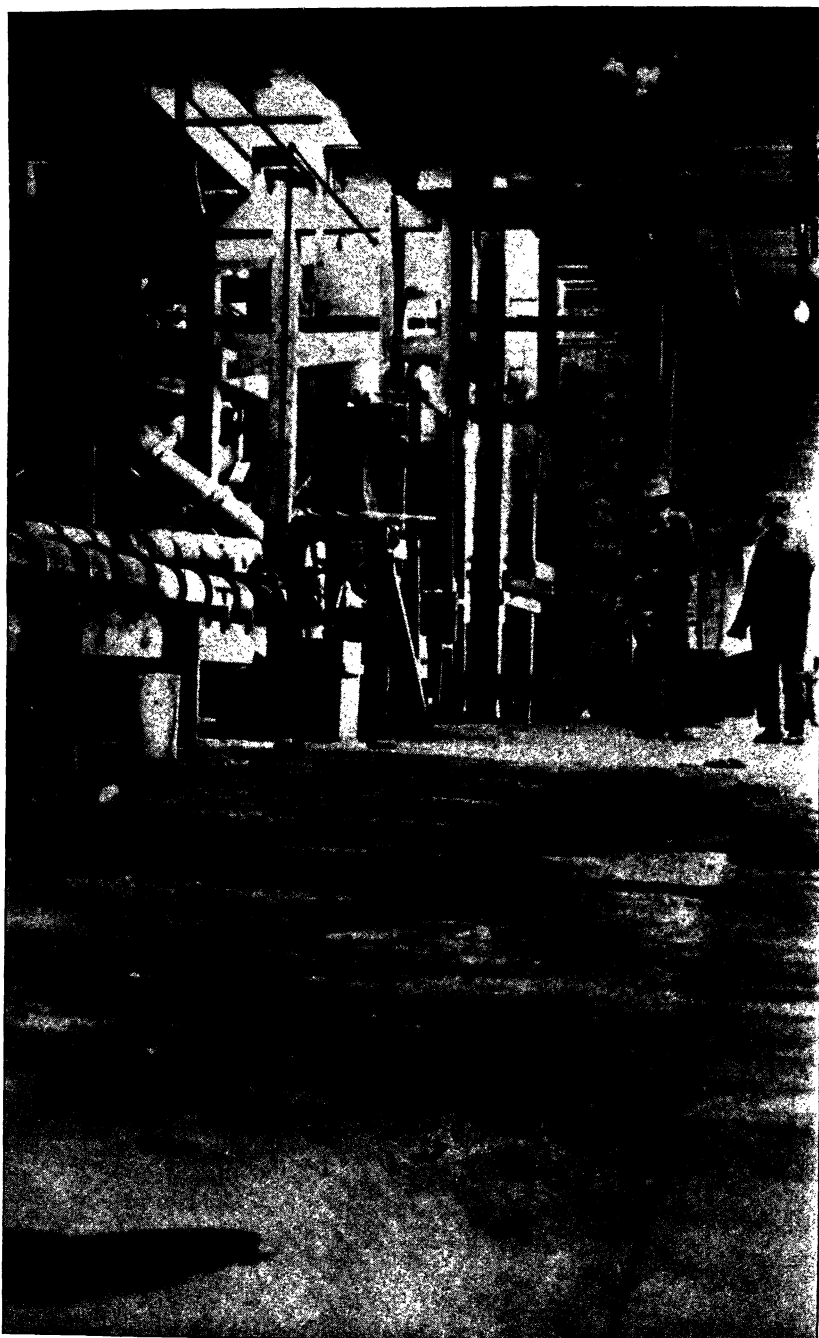
Since the publication of the report of the Illinois Occupational Diseases Committee, which included in its investigations many branches of the chemical industry, Dr. Alice Hamilton has made a number of inquiries into the lead trade and lead poisoning for the United States Department of Commerce and Labor. Bulletin No. 97 contains Dr. Hamilton's report as well as the report of Dr. Andrews on the subject. A valuable investigation by Dr. John Andrews on the subject of phosphorus poisoning was made for the American Association for Labor Legislation, and has resulted in a law enacted by Congress eliminating poisonous phosphorus from the match industry.

In June, 1911, Dr. Edward E. Pratt made an investigation of the lead factories in New York city, and the result of his investigations was embodied in the Preliminary Report of the New York State Factory Commission of 1912.

The investigations of the industrial establishments in the chemical industry by the New York State Factory Investigating Commission was begun in September, 1911. During that year seventy-four chemical establishments with 200 separate factories have been inspected by Mr. John Vogt and Mr. Stuart Owens, both competent chemists. The establishments included those for the manufacture of heavy chemicals, special chemicals, pharmaceutical supplies, colors, paints and glass.

During 1912, a general inspection has been made of forty-nine additional chemical establishments; the total number of establishments inspected in 1911 and 1912 is 142, and the total number of separate factories included in these establishments is 359. This number does not include those establishments which have been inspected by Dr. Graham-Rogers, Dr. Breithut, Dr. McKenna, and myself. Dr. C. T. Graham Rogers has inspected a large number of establishments manufacturing lead and lead compounds; Dr. Breithut and I have inspected a large number of wood alcohol





PLANT R, NIAGARA FALLS, N. Y.

Muriatic acid room, where men, poorly protected with old rags tied about their mouths, are subjected to acid fumes, unbearable for two minutes to investigators.

distilling and refining establishments as well as others where wood alcohol is largely used; Dr. McKenna and I inspected all the chemical establishments in Niagara Falls, and a number of the largest establishments in Laurel Hill, Long Island, Albany, Syracuse, Schenectady and Buffalo. Outside of the State, I have personally inspected several chemical establishments in New Jersey and Illinois.

The following table gives the results of the general sanitary inspection of the establishments and factories made by our staff in 1911 and 1912:

TABLE NO. XV.

CHEMICAL ESTABLISHMENTS INSPECTED IN 1911 AND 1912 CLASSIFIED ACCORDING TO TYPE OF BUILDING, WAGE EARNERS, LIGHT AND VENTILATION, CLEANLINESS OF SHOPS AND SPECIAL CONVENIENCES.

Number of establishments.....	142
Number of shops.....	359 (b)

	Number of establishments.	Per Cent.
<i>Types of Building:</i>		
Special factory.....	121	85.2
Loft.....	16	11.3
Converted tenement or dwelling.....	4	2.8
Not specified.....	1	0.7
Total.....	142	100.0
<i>Wage earners:</i>		
Men.....	9,842	88.8
Women.....	1,218	11.0
Minors under 16.....	27	0.2
Total.....	11,087	100.0
<i>Light and Ventilation:</i>		
Inadequate light in shops.....	232	64.6
Shops using mechanical ventilation.....	41	11.4
Shops using special devices.....	110	30.6
<i>Cleanliness of Shop:</i>		
Good.....	131	36.5
Poor.....	209	58.2
Bad.....	16	4.5
No report.....	3	0.8
Total.....	359	100.0
<i>Establishments Having Special Conveniences:</i>		
Adequate washing facilities.....	75	52.8
Separate lunch rooms.....	12	8.4
Separate dressing rooms.....	13 (c)	26.5

(b) The actual number of shops was much greater; in 15 large establishments the number of shops was not taken, and the establishment was considered as one shop.

(c) Per cent. of establishments providing separate dressing rooms is taken from the total number of establishments (49) investigated in 1912.

IV.

GENERAL SANITARY CONDITIONS.

Buildings:

There are a number of special reasons why this industry is conspicuous for deplorable conditions under which work is carried on.

In the first place, most chemical establishments are located at some distance from the congested city districts, in special factory buildings of a very inferior type. A large number of them are one-story wooden, ramshackle structures, either hastily built for the industry or converted to its use. On account of the rapid evolution of processes accompanied by changing conditions generally in this trade, it seems to be the tendency among most of the owners not to build permanent structures, but to house the manufacture in temporary frame buildings. In most cases there are a number of separate buildings, to which additions are made from time to time with the growth of production.

Fire Hazard:

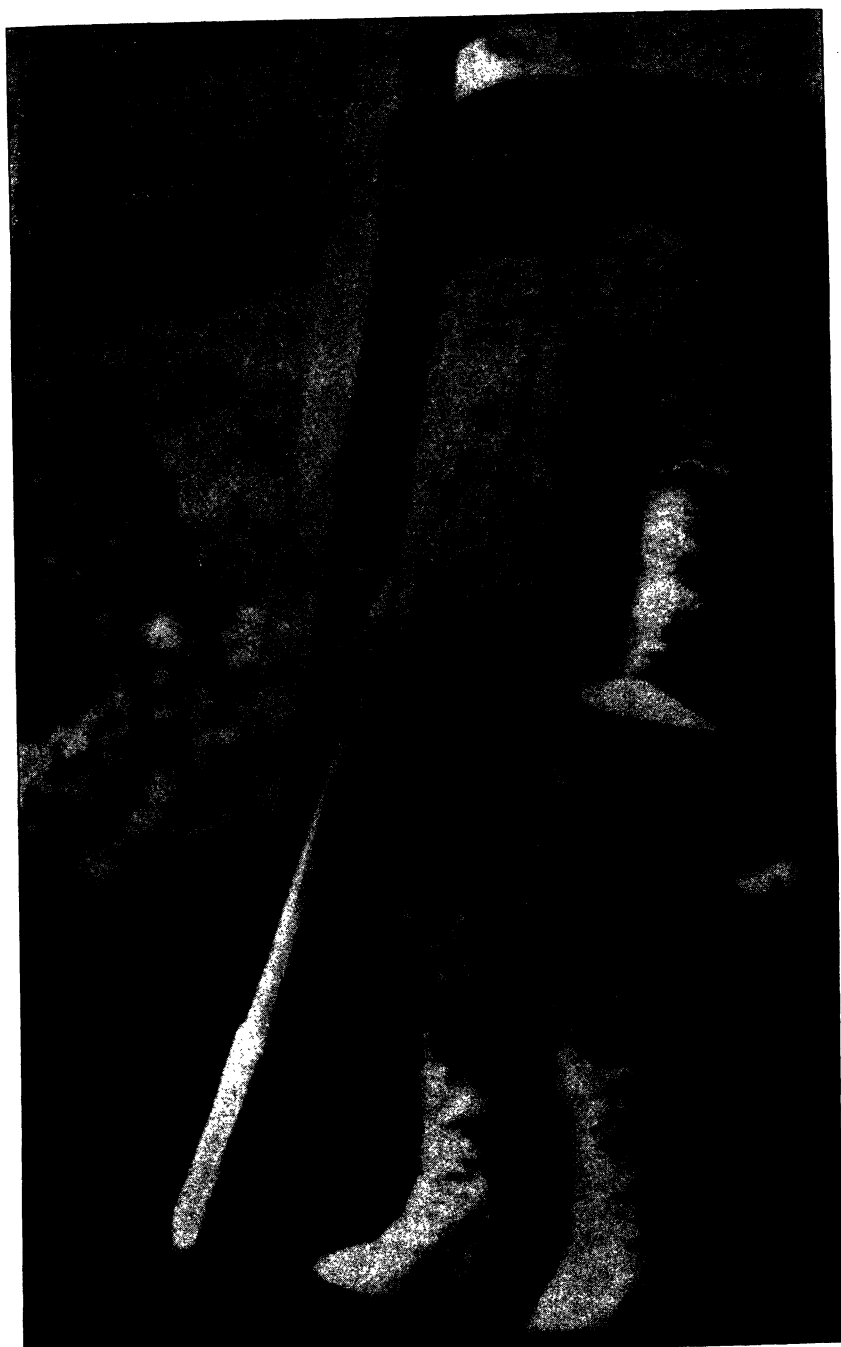
In matters of fire protection, the buildings themselves are seldom provided with sprinklers or with other modern fire protecting devices. But the danger from fire is probably the least of the dangers in the trade. Here and there, especially among the very large establishments, modern structures were found amply equipped with all modern improvements, including necessary fire protection. At Niagara Falls most of the buildings housing the chemical industry were of recent construction, and many of them were equipped with all the modern fire preventive devices and improvements.

Machinery Protection:

There is some machinery in nearly every chemical plant, but so far as we could discover very little attention is paid in the majority of plants to the proper protection and safeguarding of the dangerous parts.

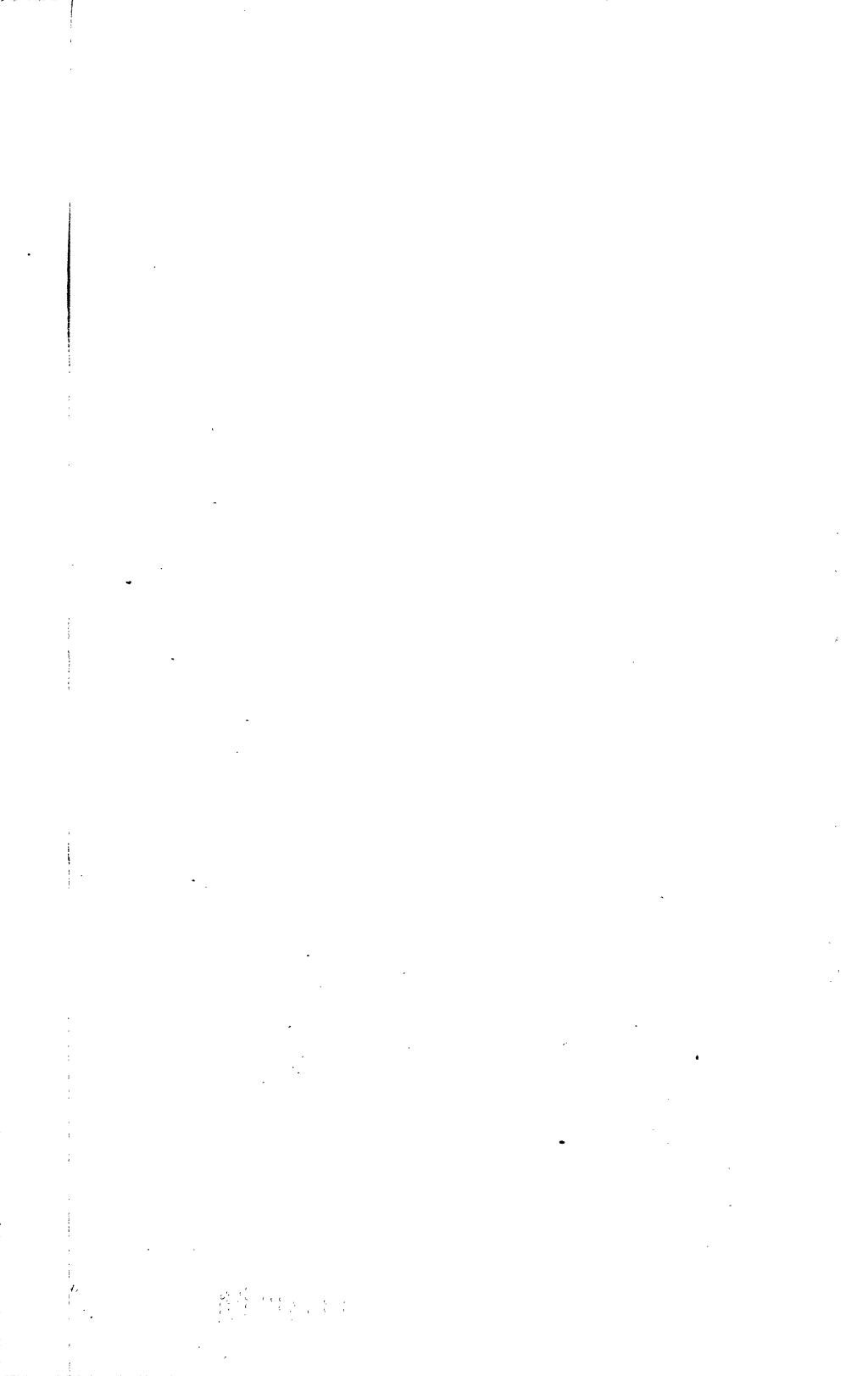
Lighting:

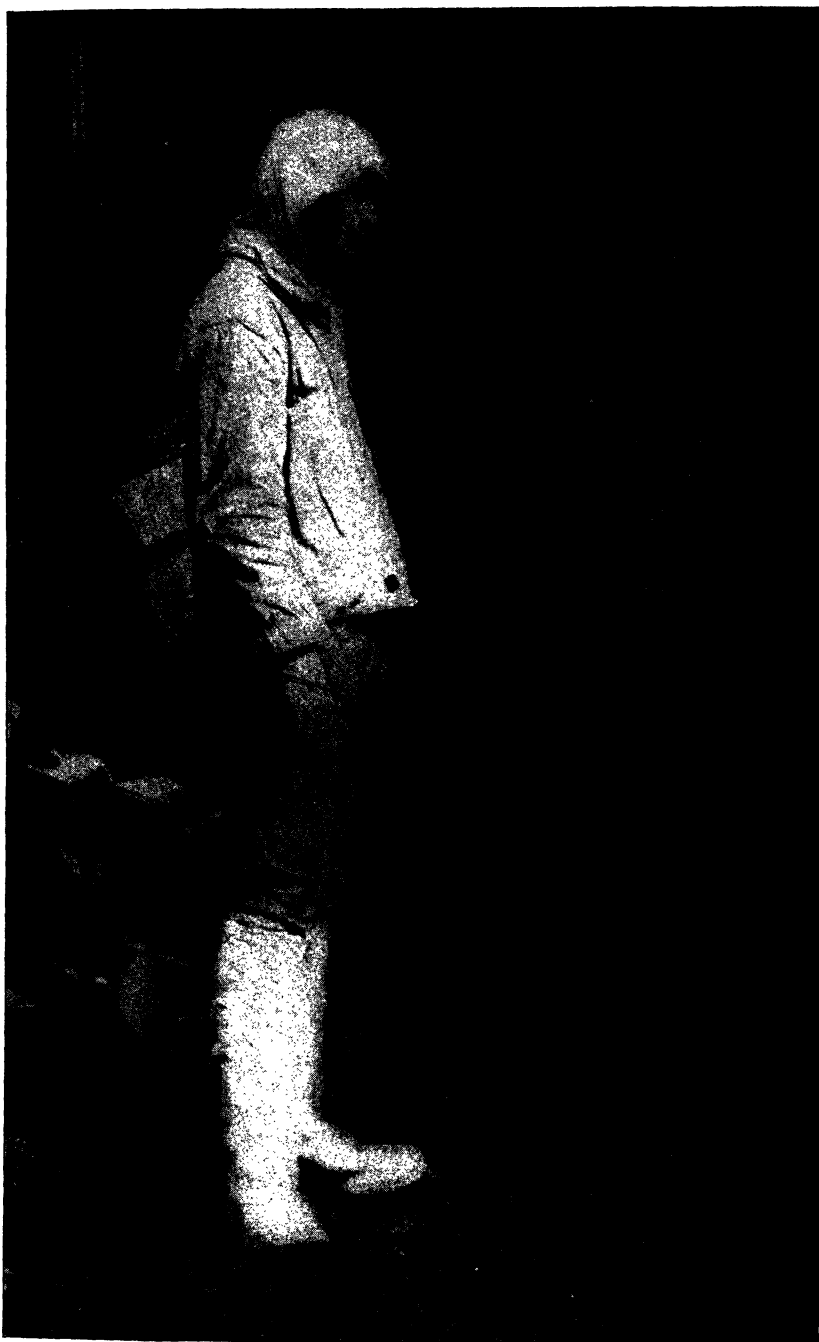
Very little close work demanding strong light is done in the average chemical establishment, but the dangerous materials



PLANT R, NIAGARA FALLS, N. Y.
Distributer of alkalai.

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PLANT B, NIAGARA FALLS, N. Y.
Distributer of lime.—Clouds of the fine penetrating white dust settle all
over the workers.

employed and processes demand good light. According to our investigators, however, the lighting was found inadequate in 232, or 64.4 per cent, of the factories inspected.

In going through chemical establishments, one often passes through dimly lighted passages where numbers of workers are engaged either in shoveling dangerous mixtures into wheelbarrows or packing various toxic products into barrels, or working around vats, caldrons and tanks filled with dangerous liquids amid clouds of steam or chemical fumes. Any carelessness on the part of these workers, resulting in a spurt of these liquids, might mean a permanent injury. In one of the electrolytic plants at Niagara Falls a worker was observed in a dark corner passing under an iron trough clumsily supported on wooden blocks and filled with hot liquid caustic soda, every drop of which, coming in contact with the body, would produce a painful and permanent injury. The only light was an incandescent bulb held by the workers to illuminate the running of the caustic in the trough and the filling up of the iron drums with the liquid.

Ventilation:

Mechanical ventilation was found in but forty-one out of the 359 chemical plants. This implies great negligence on the part of the owners of these establishments and heads of the establishments, especially when we take into consideration that there is no industry where mechanical ventilation is so imperatively needed as in chemical works. The poisonous materials, the dangerous fumes and gases, the dusty processes and the excessive temperatures which are so common in this industry cannot otherwise be rendered harmless, and the workers cannot otherwise be protected than by proper systems of mechanical ventilation. Windows and skylights have as a rule been found tightly closed, and the special devices installed in 30.6 per cent of the shops were in a large number of cases inoperative, inadequate and useless.

Washing Facilities:

In but very few of the establishments was hot water provided for washing, and even after the new law went into effect in October, making the provision of hot water and towels compulsory, our inspectors found that there were many employers who

had not heard of the law and others who, having knowledge of it, made no provision for its fulfilment. Wherever facilities were adequate they were often located in separate buildings at some distance from the main factory buildings, so that considerable time was required to reach them.

In none of the establishments inspected was provision made for the compulsory use of the washing facilities. Hand washing before eating was left to the discretion of the workers, with the result that in most of the establishments inspected workers were found eating their lunch with hands unwashed and covered often with poisonous dusts, etc.

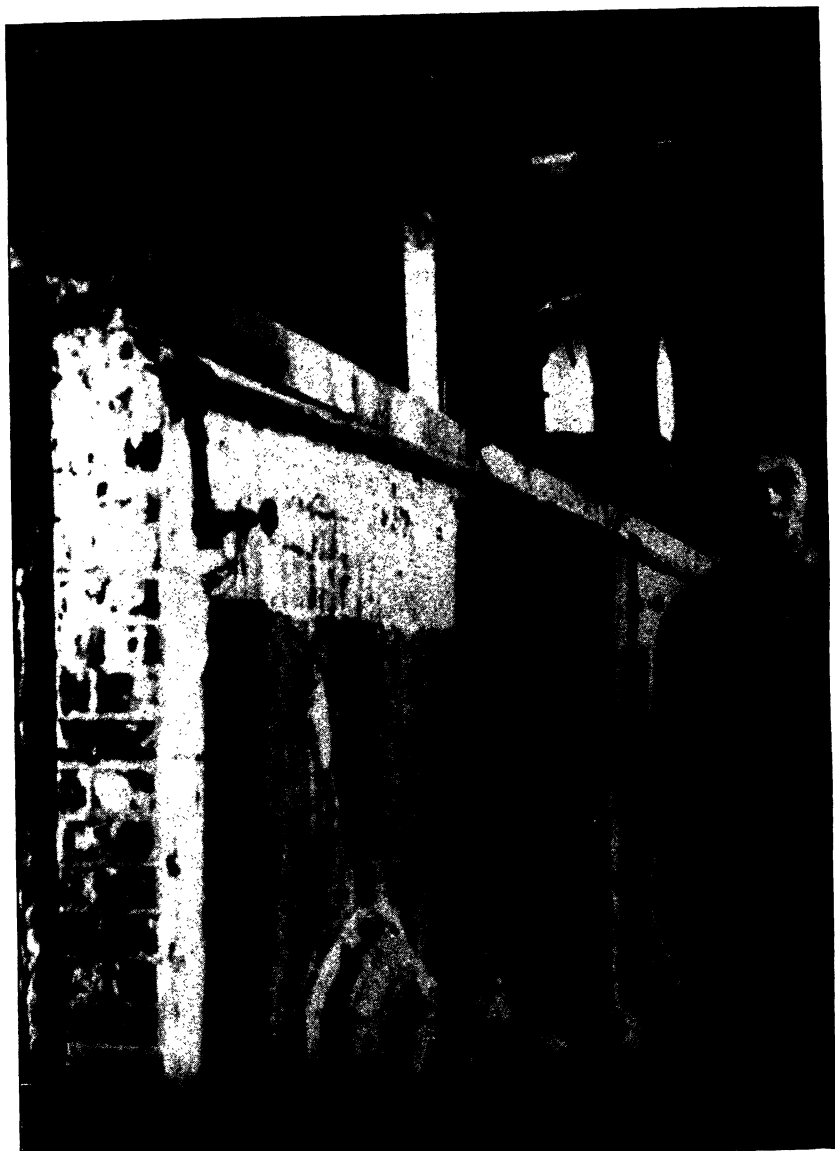
Separate lunch rooms were found in only twelve of the establishments; in all others the workers were compelled to eat their food at their place of work, often in the midst of the dust and gases of the workroom. There were but few places, only thirteen, in which separate dressing rooms were found, and in 23 per cent of the above toilets were outside the factory and usually in a very filthy condition. In a chemical factory at Buffalo the toilet consisted of a ramshackle shed over the Buffalo creek, at a distance of 100 to 150 feet from the various parts of the factory; the distance, according to the workers, was often covered during the winter with deep snow, making it very difficult of access. Such toilet accommodations are in many cases found in chemical plants.

Bathrooms were found in but two or three of the establishments. In one of the establishments at Buffalo shower baths were provided, but these were for the use of what the superintendent called the "white" workmen, which classification included only the more skilled American workers, of whom there were but few. Several hundred workers, assumed to be *not white*, were excluded from the use of these baths. In another of the establishments the bathing facilities consisted of three tanks built in the floor of a shed and filled with water of doubtful purity. Each of these tanks was intended for the use of a separate gang of workers. They were provided for the simple reason — as the superintendent explained — that the workers at their day's work became so dirty and covered with dust, colors, etc., that they were not allowed to ride in the street cars.



PLANT F, NIAGARA FALLS, N. Y.

Examining mill-stone from coal grinder in factory.—The nauseating odor of acetylene gas fills the factory where 1,000 men work, together with dense black dust.



PLANT G, NIAGARA FALLS, N. Y.
Furnace and furnace man who tends fires under great caustic pots.

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V.

THE SPECIFIC DANGERS OF THE CHEMICAL INDUSTRY.

The conditions just described are not peculiar to the nature of the chemical trade, although the general sanitation is worse in this industry than in many others. The importance and extent, however, of the occupational dangers of an industry cannot be measured by the prevailing sanitary conditions, but rather by the specific risks and hazards of the industry itself. The chief dangers to the workers found in the chemical trade may be summed up as follows: gases and fumes, poisons, dusts, and accidental injuries.

All of the more than fifty poisons on the list prepared by Professors Fischer and Sommerfeld and published in the Bulletin of the Bureau of Labor, No. 100, Department of Commerce and Labor, may be found in the various branches of the chemical trade. Where, in other trades, a poisonous ingredient is used occasionally, and dangerous gases and fumes are generated at intervals, in the chemical trade they are regularly present in most of the working processes.

In no other industry is a knowledge of the poisonous products which are handled so necessary to the worker, and yet, surprising as it may seem, in no industry is the ignorance of the worker as to the deadly nature of the substances with which he works so complete. This may be accounted for by the large number of unskilled, densely ignorant foreign laborers who are employed in extremely dangerous processes. Taking advantage of this ignorance of the worker and subjecting him to conditions fraught with fearful danger to his life, may be characterized as the peculiar reproach of the chemical trade.

In considering the dangers of this industry, I shall not discuss the subjects of lead manufacture, the manufacture and use of wood alcohol, or the manufacture and use of commercial acids. These subjects are exhaustively treated in the special reports by Dr. Graham-Rogers, Professor Baskerville and Dr. McKenna.

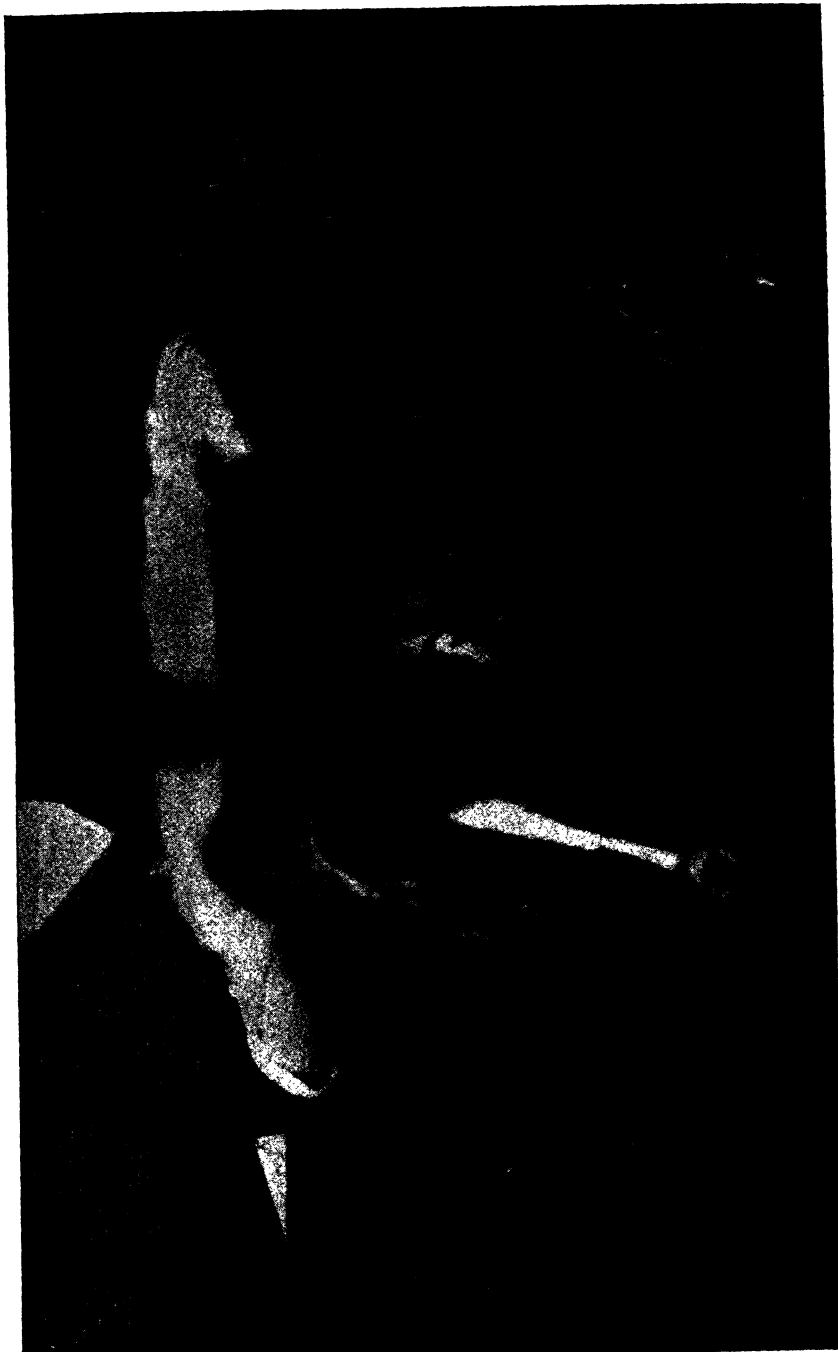
We find the presence of gases and fumes and various poisons in the manufacture of aniline dyes, in the manufacture of various arsenical colors; in the distilling of benzine; in lacquer, varnish,

and India rubber industries; in the manufacture of benzol; in sugar mills; in the refining of tallow, stearin, paraffin and wax; in the production of industrial gas; in lime and brick kilns; in the manufacture of chloride of lime, chlorine and organic chlorine products; in the manufacture of chromium preparations and chrome colors; in potteries and enameling works; in glass factories; in the manufacture of hydrofluoric and other chemical acids; in the manufacture of lead carbonates and other lead colors; in the manufacture of thermometers, barometers, incandescent electric lamps, etc.; in the manufacture of coal-tar colors and explosives; in the production and refining of oil; in anthracite coal-tar distillation; in the manufacture of phosgene, phosphorus, sulphur, sulphuric acid, sulphide of soda and other sodium preparations; and in the manufacture of tar, turpentine oils, etc., etc.

Although this list of industries is a formidable one, it includes but a very small part of those branches of the chemical industry wherein gases and fumes are evolved or poisons produced and handled in manufacture.

As is to be expected, the constant contact with dangerous elements in the trade and the daily familiarity with them breeds a natural contempt on the part of the employers and workers, and a recklessness and carelessness which would be deemed criminal in any other industry. Over and over again during my inspection of chemical plants, I have seen men handling poisonous materials such as carbonate of lead, Paris green, chrome powder and various caustic products with less thought than if these dangerous substances were sand or flour. In some of the factories visited the face and clothes of the worker and all exposed parts of his body were thickly covered with poisonous dusts or colors without his taking the least precaution against ingesting or inhaling these materials.

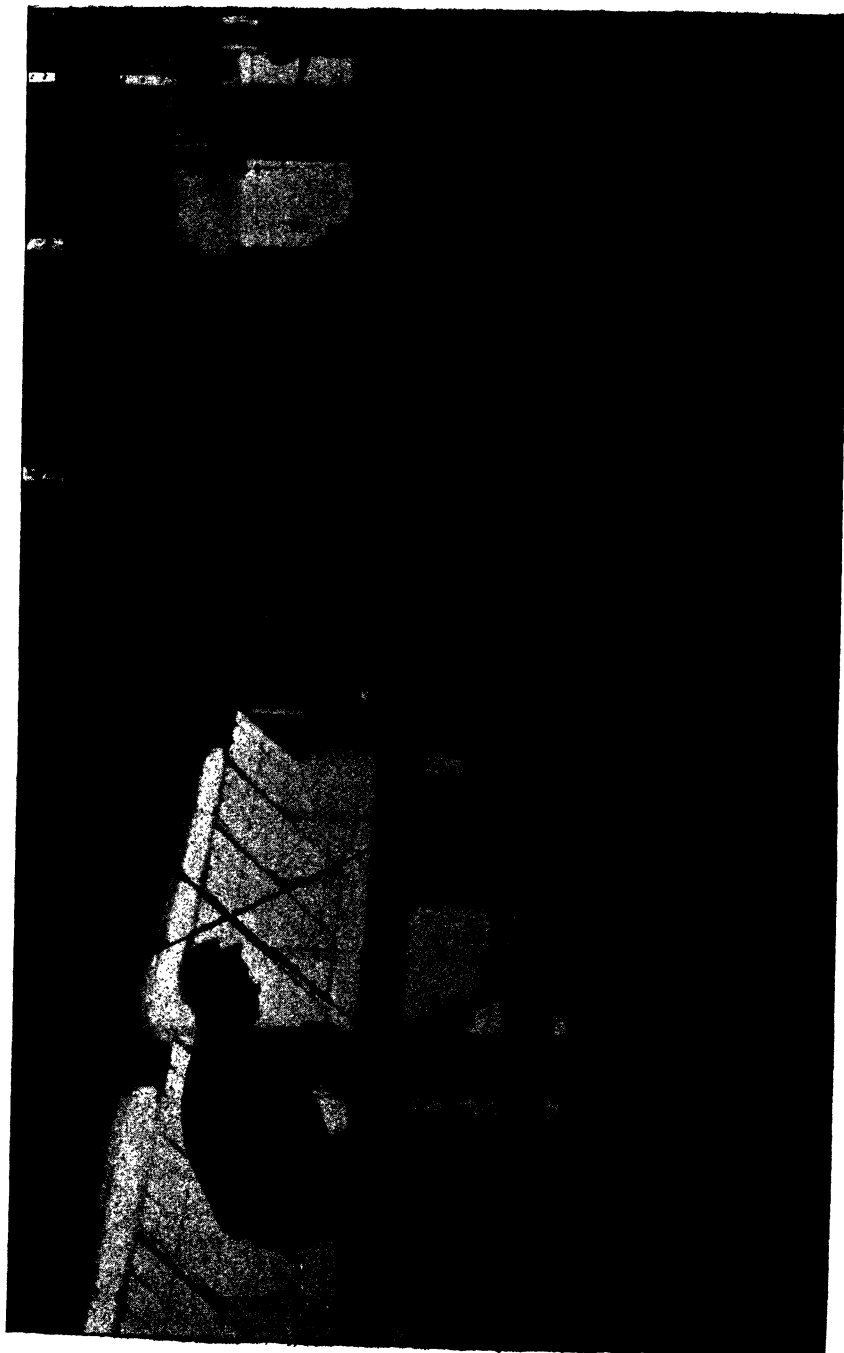
Fortunately, there are not many cases of *acute* poisoning, or "gassing," occurring in the chemical plants. It is only a robust, hardy class of workers who apply for work in these industries, and the weaklings are speedily eliminated. The result is the less frequent occurrence of acute intoxications. But poisons and gases are more dangerous perhaps because they are insidious — the pernicious effects developing with time.



PLANT C, NIAGARA FALLS, N. Y.

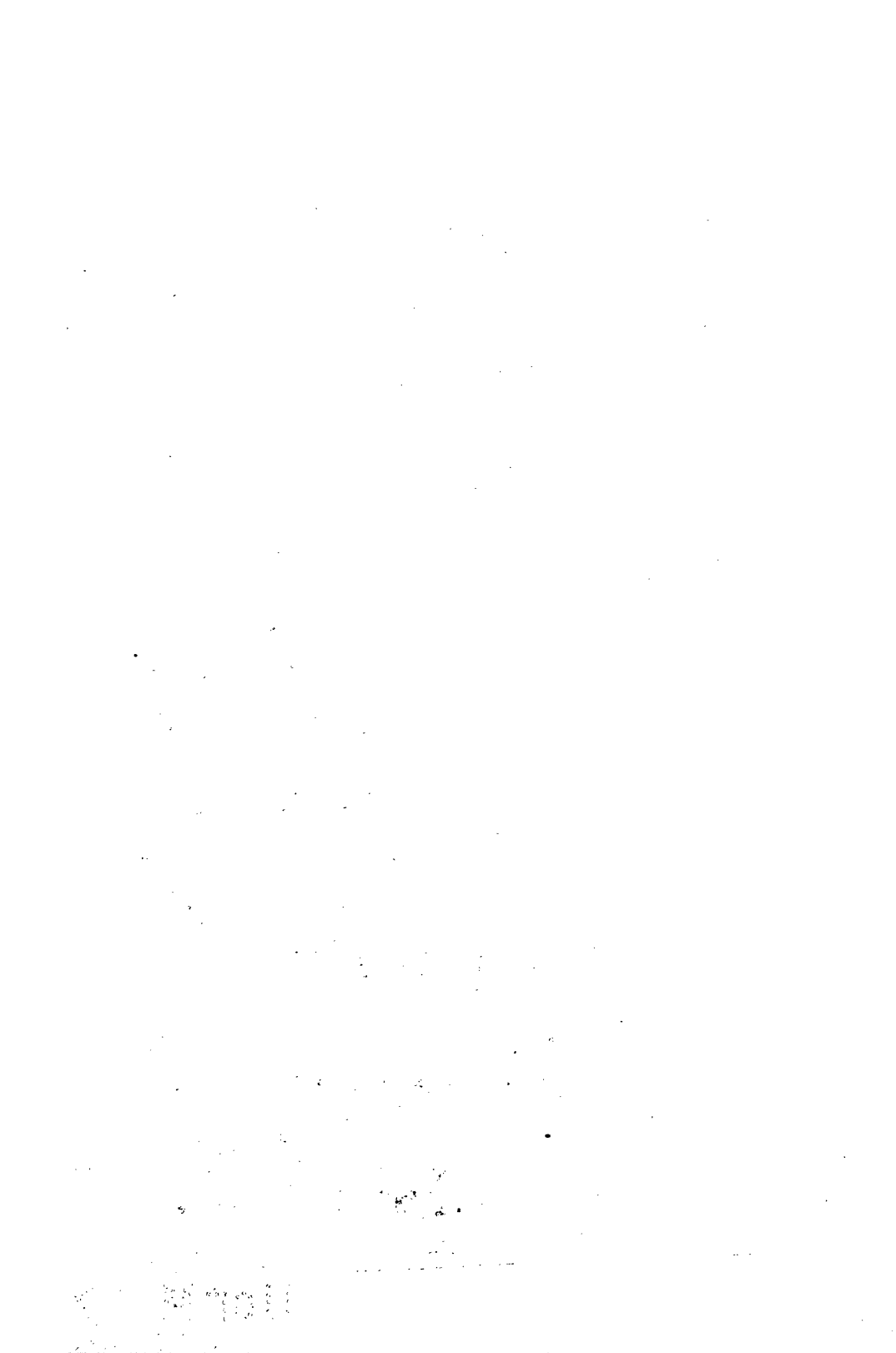
This coat has been worn less than six weeks in the factory; the acid fumes destroy the cloth, so that it falls apart.





PLANT G, NIAGARA FALLS, N. Y.

Worker on top of a caustic pot which is filled with hot alkali, testing the fluid to see if it is boiled enough.



In the industries where there is danger from lead poisoning, acute cases are very seldom found. There are, however, a number of chronic cases, although the tracing of these cases to the factories is always hedged with difficulties.

In a large lead battery plant at Niagara Falls I observed in the foundry most of the workers handling the lead without gloves or other protection from the dust. Among the workers were a number of boys between 16 and 18, and upon inquiry they asserted that they had received no instructions whatever as to the dangers of handling lead material. There was no hot water for washing the hands, nor any special lunch room for their use. One pot in which lead was being heated was without any hood whatever and discharged its poisonous fumes into the surrounding air.

Fourteen cases of acute poisoning and three cases of chronic lead poisoning have been traced by our investigators to this plant. These cases were taken from hospital records and physicians' statements and from personal histories. Although physicians had confirmed the diagnosis of all the fourteen lead cases resulting from work in this battery company, yet at a public hearing held at Niagara Falls during the current year one of the officers of the company tried to deny the existence of any danger from lead poisoning in his plant, and endeavored to prove his assertion by producing affidavits from half a dozen or more of his oldest employees, who said they had never suffered from lead poisoning. The same officer also denied that these men, whose cases had been traced directly to this plant, had ever worked there, and endeavored to prove his assertion by the incorrect spelling of the names of the workers. As most of the names were Italian and Polish, the identification by exact spelling was not without difficulty and easily afforded an opportunity for controversy.

In the developing department of the same plant the sulphuric acid fumes were strong enough to corrode the clothes of the workers, as may be seen in the photograph (page 470) of a coat which fell apart after six weeks' wear.

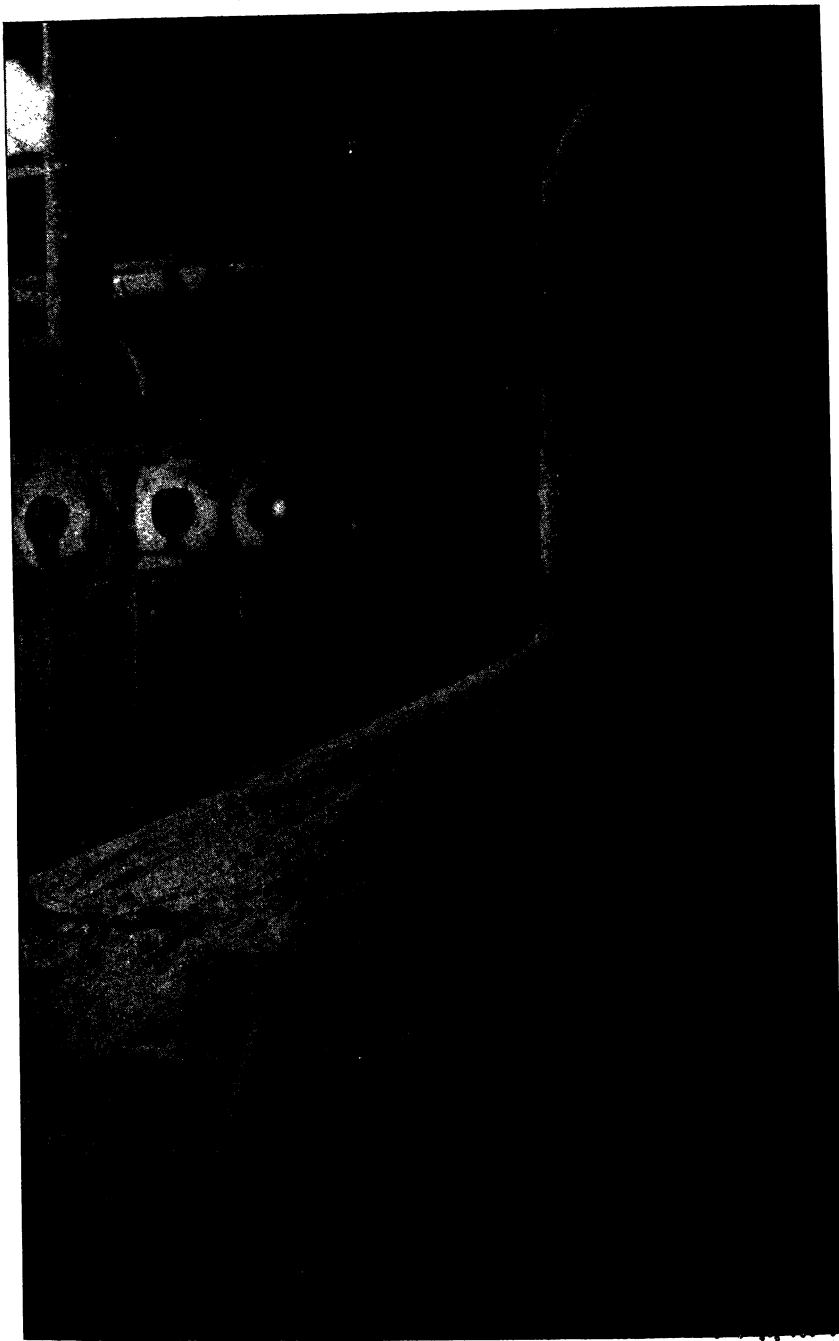
In another plant which manufactured Paris green I found workers handling and packing this poisonous material, some without gloves, all without respirators. The superintendent of

the plant told me that these men dropped out constantly and he did not know what became of them; at times he heard that they got sick or died, but there was no falling off in the applications for employment. In one plant a man died as the result of arsenical poisoning, and within a week his brother applied for his job in the same plant.

In still another plant manufacturing bichromate or chromate of potassium and chrome colors, which produce dangerous sores and injuries, nothing was provided to protect the workers from contact with the material.

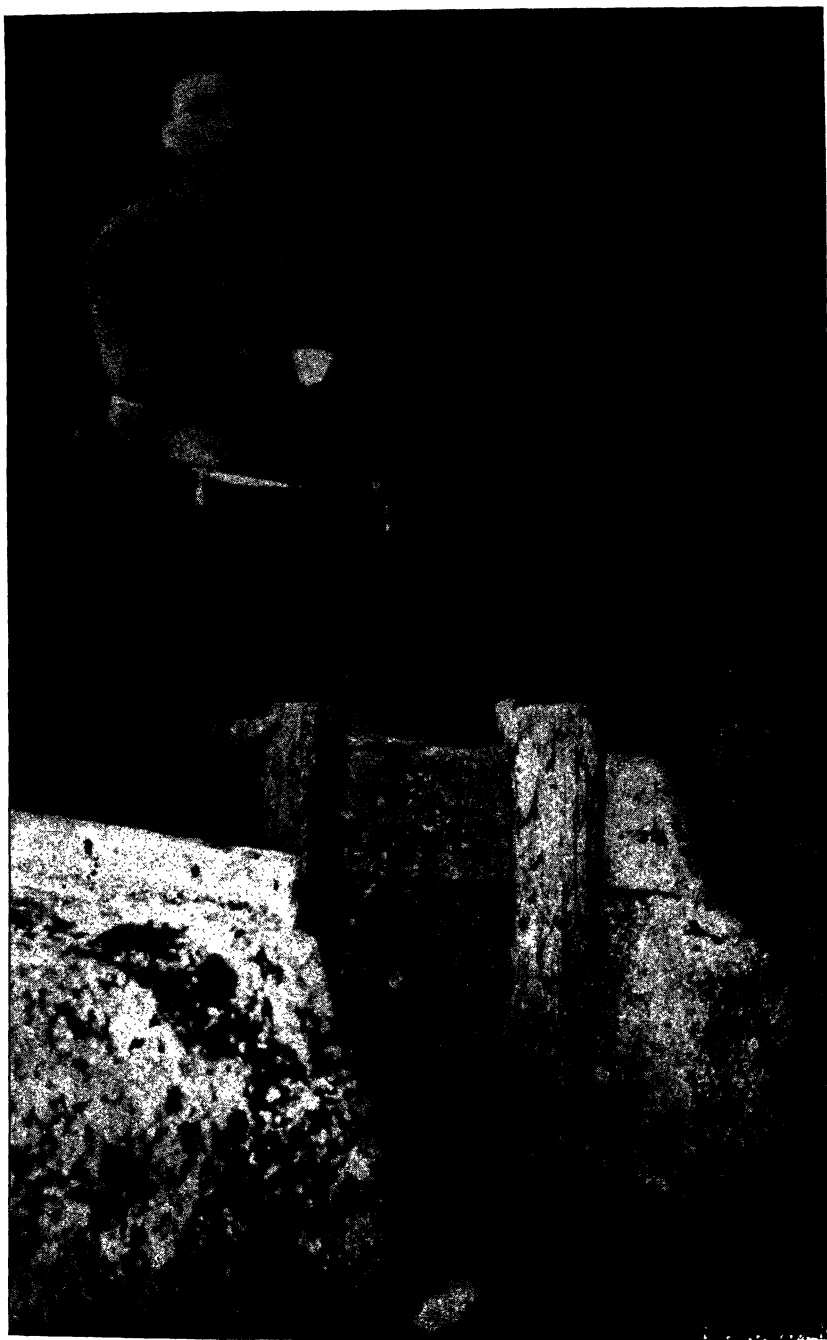
The manufacture of bleaches and bleach powders, which is concentrated at Niagara Falls, is fraught with many dangers to the workers, but like the other processes it is without any official supervision or protection to the workers. The electrolytic process of manufacturing chlorine gas is used in these plants; the bleach chambers, however, are such as were used in the old Weldon process. These bleach chambers consist of large rooms approximately 25x100 feet in size and six feet high. The lime is spread on the floors several inches thick and harrowed into narrow furrows; then the chlorine gas is let into these chambers until the lime absorbs a sufficient quantity of the gas, when the chambers are opened and fresh air is let in. The workers then go into the chambers and rake up the lime saturated with the chlorine gas and pass it down the chutes through traps in the chamber floors. In spite of the opening of the door and a window opposite the door, considerable gas is left in the chambers and much is set free during the raking up of the bleach powder. This process raises clouds of dust, and the chlorine gas in the air of the chamber is so overpowering that it is impossible for one to stay in the chamber for even a short time without some protection. The work must be done with great speed in order not to waste the chlorine gas; the heat in the chambers is excessive, and in general the conditions are such as to make this work more trying and exhausting than almost any other process whatsoever.

The workers wear special clothes, caps and gloves, for the bleach powder is very irritating and destructive, sores resulting when it comes in contact with the bare skin. The eyes are protected by goggles, the head is covered, the mouth is covered by



PLANT G, NIAGARA FALLS, N. Y.
Open pot where caustic is boiled.





PLANT G, NIAGARA FALLS, N. Y.

"Firing up" under caustic pots where a drop of caustic means a burn.

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six or seven folds of heavy flannel through which the men must inspire, while expiration takes place through the nostrils, which are in close contact with the flannel. This apparatus, if it may be called by that name, is termed by the men the "muzzle," and it requires some experience for a man to be able to properly use it. Only those who are able to wear such muzzles are allowed to work in the bleach chambers. Even to those accustomed to wearing them they cause considerable difficulty in breathing, and consequently they cannot be worn for a long period. When the muzzle is worn in a gassy bleach chamber, with the dust, heat and gas, and with the speed required for the work, the time that the workers may remain in the chamber with comparative comfort is very short, ranging from ten to thirty minutes. The men coming out from the chambers present a pitiful appearance. They are all covered with bleach dust; their eyebrows and exposed parts are permanently whitened by the action of the bleach; the perspiration is profuse and runs down the face; the breath is labored and hurried; the pulse is high, ranging, in my examination of several workers, from 96 to 110 degrees per minute. The workers in this exhausted condition quickly throw off their muzzles and rush for the open windows, gasping for breath.

Our inspection was made in the summer when the windows were open, and the ghastly faces of the exhausted chamber workers as they thrust their heads through the windows into the outer air made a gravely impressive picture. Whether the windows are open in the bleach chambers during the winter time could not be definitely ascertained, as the testimony of the different workers varied in regard to this. It frequently happens that the workers are "gassed," i. e., overcome by the chlorine gas. This produces nausea, fainting, vomiting and occasionally unconsciousness. Sneezing and coughing are always attendant upon work in the bleach chambers. Most of the men are robust and strong, for only such are able to do the work; there is, however, no physical examination of applicants for this work. Those who were found working were generally between the ages of 20 and 30, although much older in appearance; in fact, they seem quite aged at 30. The work in the bleach chamber is done by gangs

of four or five, and consists not only in removing the bleach from the chambers but also in preparing the lime in the chambers and in the general care of these rooms. Their work inside the chambers is fortunately not continuous; while one gang goes in for fifteen to thirty minutes, the other gang is preparing the lime in another part of the plant, thus alternating the work. The system of compensation for the work is based on a ton of product and is considered quite high; at least, it is known that these workers are the most highly paid in the plant outside of the skilled workers. Their earnings range from \$12 for beginners to \$25 per week, the largest number of bleachers making between \$18 and \$25 per week. Comparatively few of these bleach chamber operatives had been long at this work, only ten or twelve among them having worked over five years.

Out of the fifty-nine bleach chamber workers whose individual histories were taken, there were only sixteen who did not complain of some affection of the nose, throat, eyes, or who did not suffer from a cough, nausea, headache or other ailment.

The gangs work in shifts, in some plants there being two, in others three shifts. Of the fifty-nine workers, two were found to work forty hours per week, seventeen worked forty-eight to fifty-two hours per week, twelve worked sixty per week and three worked sixty-six to seventy-two hours per week. Out of the fifty-nine bleach workers whose histories were taken, forty-six claimed to have knowledge of the dangerous character of their work and thirty-seven said that instructions were given them how to take care of themselves.

The English Alkali Act makes special and minute provisions for the control of this industry and the protection of the workers in it. The amount of free chlorine gas in the air of the chamber, the time the worker may stay therein, and many other details of this branch of the trade are minutely prescribed and the strictest supervision is maintained.

Dusts:

Dusty processes are common to many industries and the dangers of dust are not confined to the chemical trade. In the manufacture of various vegetable preparations, in textile mills, in cement factories and in various other industries clouds of dust



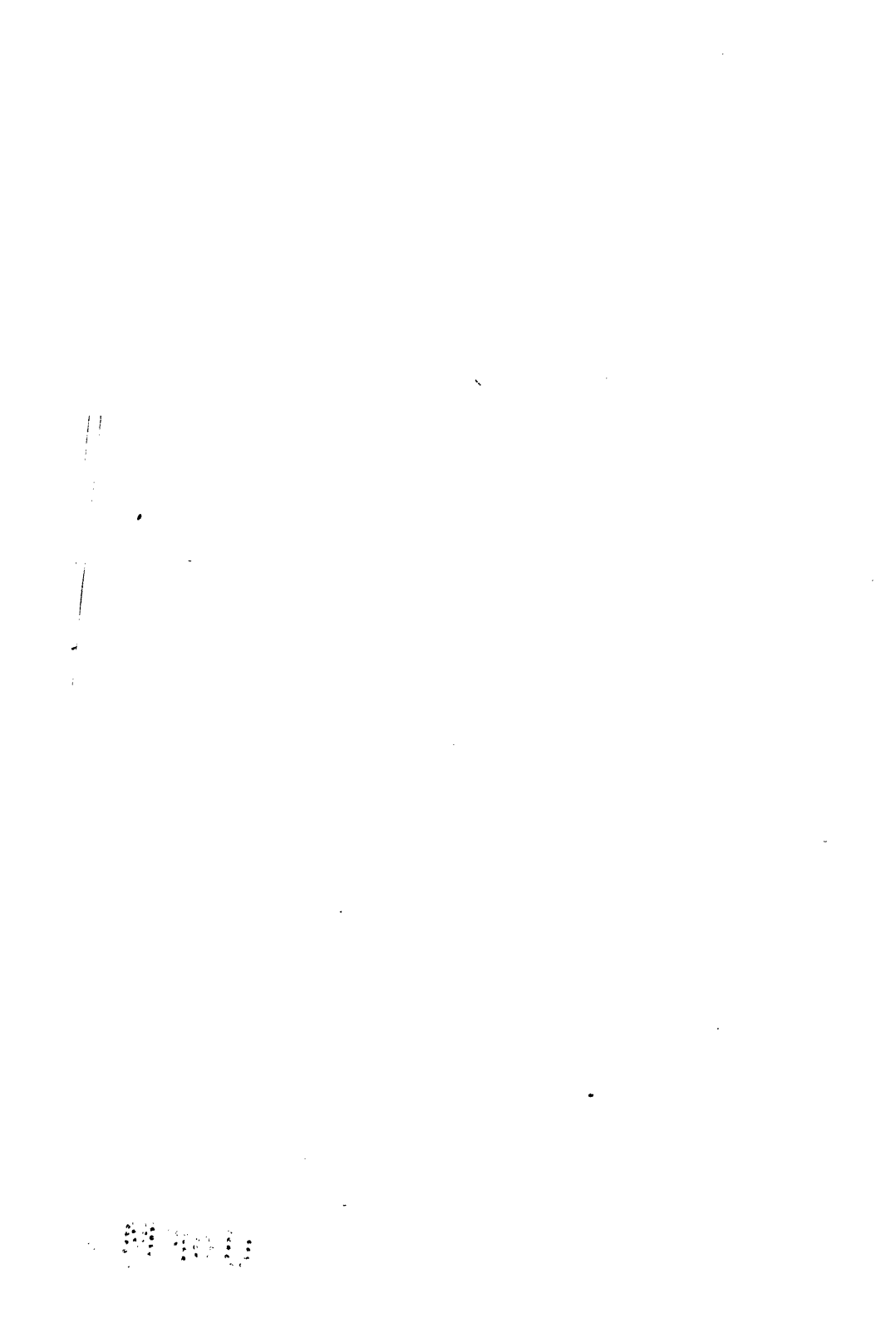
PLANT G, NIAGARA FALLS, N. Y.
"Finisher" at the great caustic pot, where caustic is boiled in a chemical
factory.

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PLANT G, NIAGARA FALLS, N. Y.

Furnaces over which caustic pots are heated.—The caustic boils over sometimes and the furnace men are burned, the caustic eating quickly through the clothes.



are often raised, and the problem of dust elimination is a grave and important one in industrial hygiene. What makes the dust in chemical works more dangerous is the fact that it is, mostly of mineral origin; it is, moreover, often poisonous, and thus produces not only the irritating effects of common dust but also the toxic effects of the poison. The manufacture of various colors, arsenical and lead preparations, chrome, potash and other powders, bleaches, abrasives, etc., is always attended by the production of quantities of dust. Notwithstanding this obvious fact, there is no industry in which there is apparently less effort made to prevent the production of the dust and its coming into contact with the worker than in the various chemical establishments.

While the manufacture of abrasives like carborundum, alum-dum, etc., or of graphite, carbide, etc., is not strictly a chemical process, it is one of the principal electro-thermal trades carried on at Niagara Falls. The manufacture of the abrasives as well as of carbide and graphite is an extremely dusty process. Greater quantities of dust are created in these manufacturing plants than in any other industrial establishments inspected. The electrical furnaces in which these products are manufactured are so huge that it seems to be impracticable to enclose them in suction apparatus. Some of these dusts are mechanical irritants, while others like carbide have also a chemically irritant action upon the skin and mucuous membranes. In almost all chemical establishments a profusion of dust is created in the various grinding and packing departments. The shoveling of raw material, the grinding of the various materials, and the packing of the finished products are all dusty processes which are usually done without protection to the operatives who are compelled to work in clouds of dust, inhaling and ingesting much of it.

Whether the high rate of mortality at Niagara Falls and the high percentage of tuberculosis — the highest in both cases of any city in the state — are partly due to the work in these dusty plants, cannot be definitely determined, although it is highly probable.

Temperature:

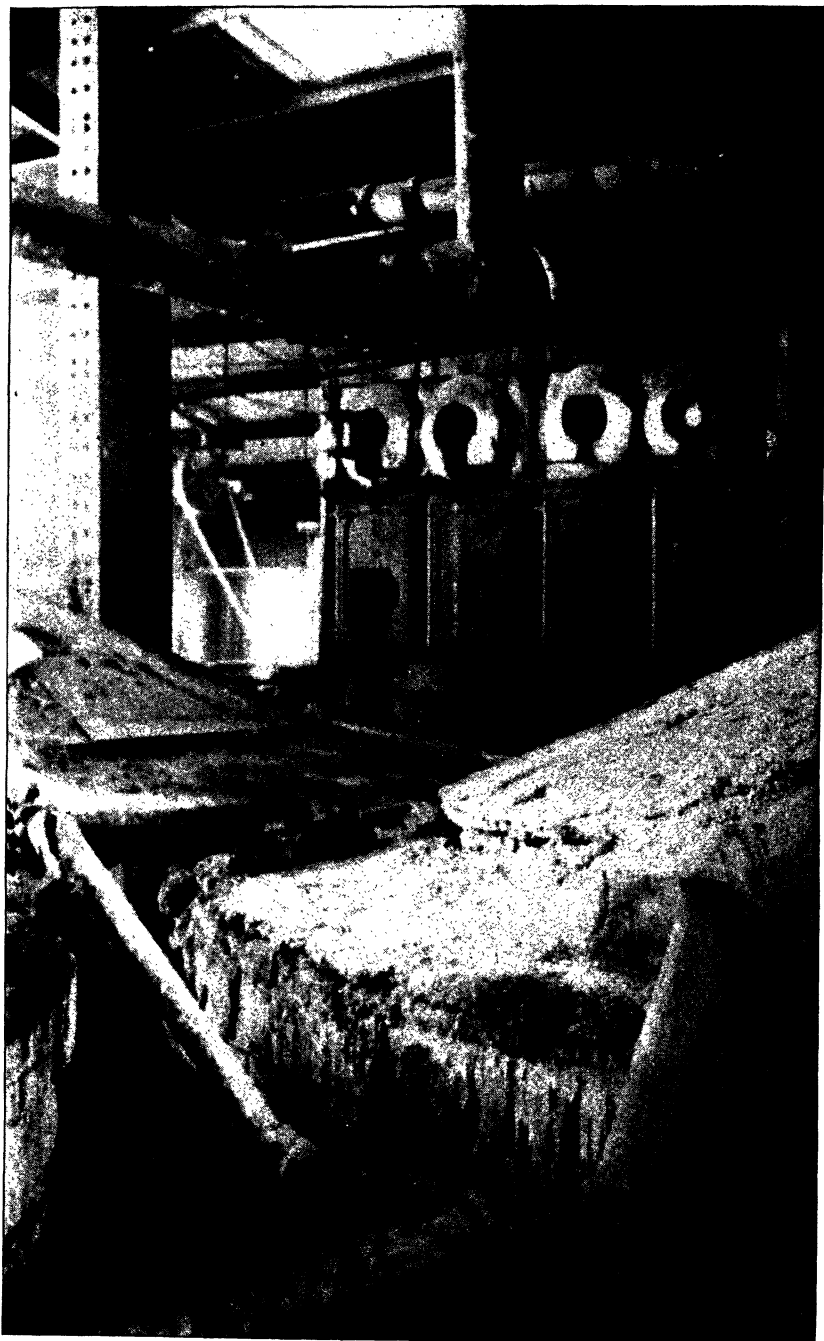
In many of the chemical establishments extremely high temperatures are created by the furnaces in constant use. The work

in front of the furnaces and at short distances from them is very exhausting on account of these high temperatures. In one of the establishments inspected at Niagara Falls our thermometer refused to perform its function within fifty or seventy-five feet of the furnace, as its limit of 100 degrees was exceeded. The temperature at that place was said by the superintendent to be 120 to 140 degrees Fahrenheit, and the heat and glare was so overpowering that the men had to kneel or stoop and hold something before their eyes in order to continue their work.

Accidents:

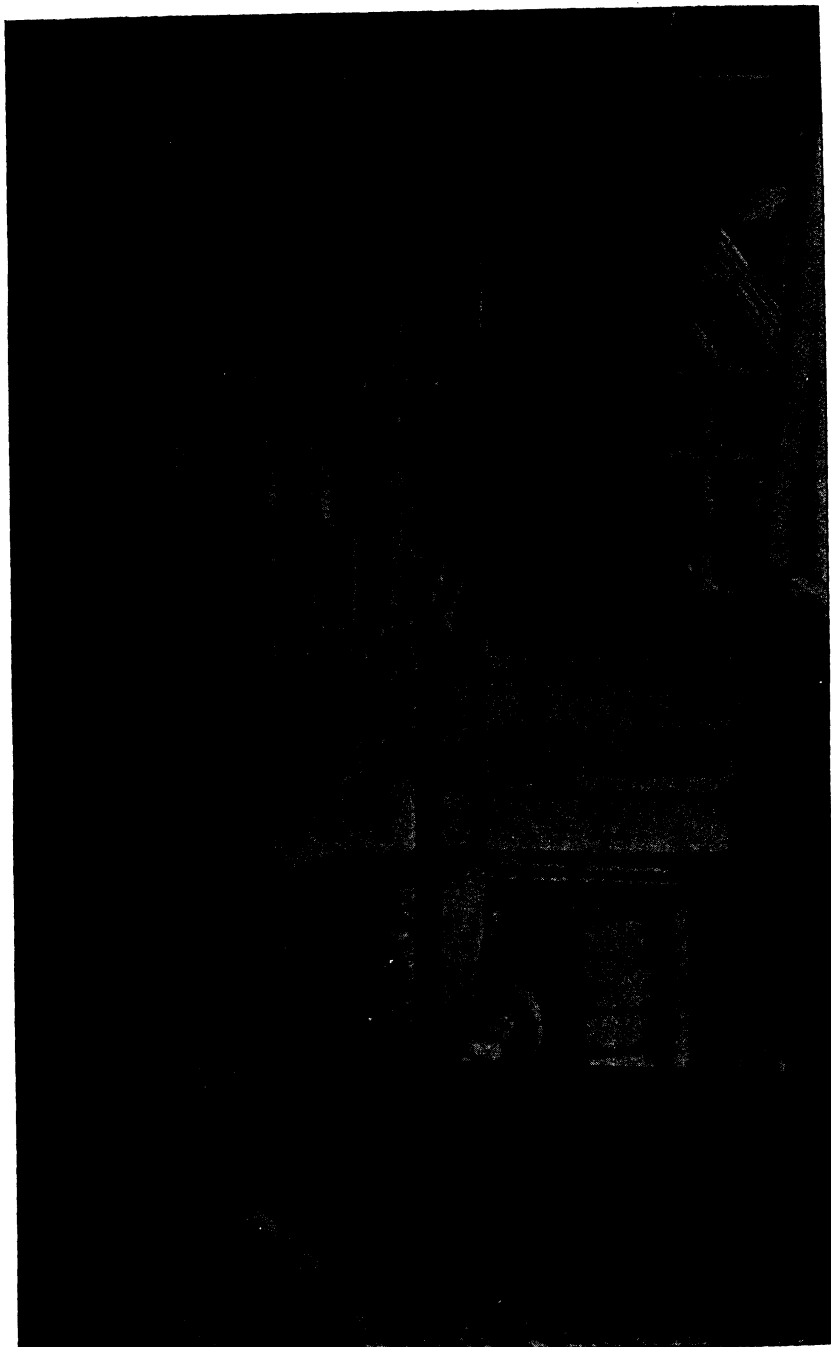
The frequency of accidents in chemical establishments is due to the ordinary hazards found in any factory where dangerous machinery is used, but more especially to certain causes which are peculiar to the industry. One of the chief causes of accidents is the large number of pots, vats, pans and other containers of mortally dangerous solids and liquids which are often carelessly situated and entirely unprotected. After going through many of the chemical establishments and seeing the various drums and kettles boiling and seething with dangerous liquids every spurt and drop of which leaves a permanent burn and injury; the big caldrons filled with liquid potash or soda — unprotected and open — one wonders not at the number of accidents which occur, but that the number is no larger. The ladling out of the caustic from the pots into the iron drums is done by the workers by means of long-armed ladles, and the worker is very often close to the edge of the caustic pot. Fatal accidents have resulted from the performance of this work.

A notably dangerous process was observed by members of the Commission during the inspection of a certain establishment which manufactured caustic potash. Liquid caustic was being sent through several sections of a shallow iron trough, these sections being supported by several wooden blocks at the junctions. The process was being carried on in a dimly lighted place; the workmen attending to the drum passed frequently under the trough without any thought apparently that the dislodgment of any one of the blocks might mean instant death through the down-pour of the boiling liquid.



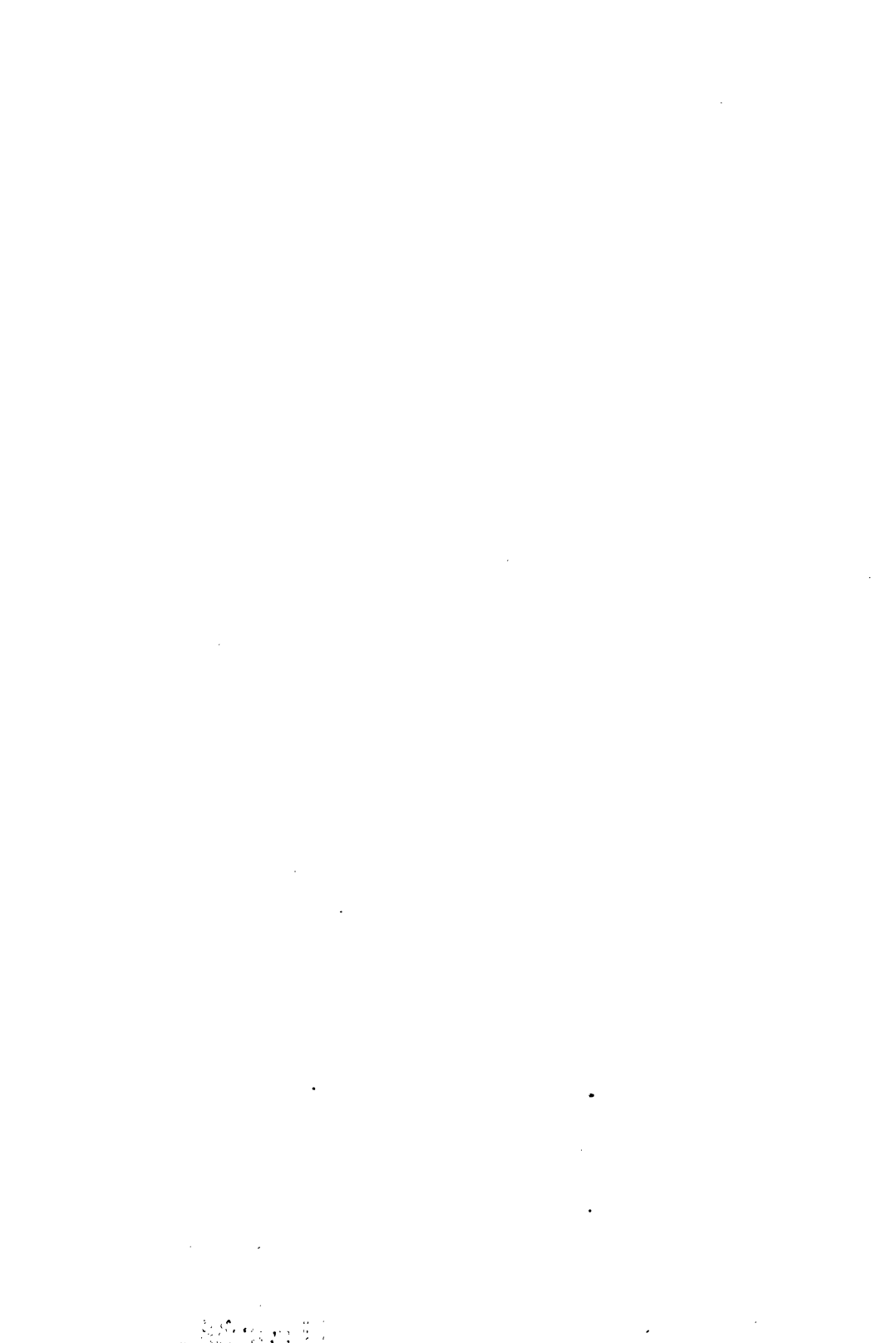
PLANT G, NIAGARA FALLS, N. Y.
Caustic "pots" on top of which men must walk as they work.





PLANT G, NIAGARA FALLS, N. Y.
Sealed "bleach" chambers.

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The list of accidents, which will be found in Chapter VII, is but a partial indication of the frequency of accidents; the tables and histories presented there do not exhibit the full extent of the perils incident to this trade.

Workers:

It is difficult to estimate the number of workers in the chemical trades for the reason that the classification is variously made by statistical bureaus and the census. A large number of trades are included in the chemical industry which do not properly belong to it. At the same time, a number of trades which are undoubtedly chemical in their nature are not included in the classification.

Neither can an exact estimate be made of the nationality of the workers in this industry. As a matter of observation it is a noteworthy fact that there are more foreign born workers in this industry than in any other. Our investigators have not made a statistical inquiry into the nationality of the workers, but my impression, based on the inspection of a large number of factories and upon the reports of the investigators, is that from seventy-five to ninety per cent of the workers in the general chemical trades in the State are Italian and Polish immigrants.

In most industries the workers are divided into many grades and degrees according to their skill, but the chemical industry is peculiar in that its workers are divided, as a rule, into but two main classes: (1) a very large percentage of unskilled laborers (foreign); and (2) a very small percentage of skilled foremen and scientific laboratory experts (American). This is readily explained by the fact that most of the work in chemical factories consists in attention to the furnaces, the mixing, grinding and sifting of materials, watching and tending the boilers, vats, tanks, etc., ladling out liquids, packing powders and other similar work which needs no special skill and which may be performed by any laborer of average intelligence after comparatively short training; hence the large number of foreign common laborers in this trade.

This partly explains the general insanitary conditions prevailing in this class of establishments. What American skilled workers would not tolerate for any length of time — conditions which

employers would not dare subject American workers to — are willing endured by ignorant foreigners. The owners of these establishments do not seem to realize their responsibility in these matters and they are culpably negligent in not providing better sanitary working conditions.

One thing above all others strikes the investigator making an inspection in chemical trades. It is the utter contempt of the skilled American foreman or the scientific laboratory worker for the unskilled foreign laborer. This contempt easily explains the neglect by the employers of the sanitary care and comfort of the unskilled workers. Over and over again I was told by managers and superintendents, whenever I drew their attention to the grossly insanitary "conveniences" in their establishments, that they were "good enough for hunkeys and polacks and dagoes." As a matter of fact these workers are not regarded as "white."

In a large chemical factory at Buffalo, I found a solitary shower bath installed in one part of the building, with a modern porcelain toilet. The superintendent in showing me these modern conveniences explained that they were intended only for the use of the "white" men.

There is very little attempt made on the part of managers to instruct the foreign laborer in the dangers of the materials with which he works or the inevitable peril to his life consequent on certain processes. Very few printed notices or precautions are posted in the native languages of the workers, and the matter of instruction is naturally made more difficult by the inability of the managers to understand the workers, and vice versa.

The workers whom I have interviewed in their native languages as to their knowledge of the dangers of the materials with which they work have invariably given a negative answer, and I have found workers handling lead, arsenic and other poisons without having the least idea of the dangers of the work or the consequences of the careless handling such materials. I have seen in a factory one man who had pronounced symptoms of lead poisoning, and who upon my inquiry told me that he was told by the physician that his abdominal pains, gastric troubles and nervousness were due to rheumatism, and that many of the workers in his shop suffered from the same complaints on account of the dampness of the shop.



PLANT B, NIAGARA FALLS, N. Y.

Soda packers.—Second man has just come from packing and ragged, worn clothes show effect of soda.

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PLANT B, NIAGARA FALLS, N. Y.

a Man who tends doors of sealed bleach chamber from which a few breaths of chlorine may unbalance the mind; *b* Man who paints drums into which bleach is packed.

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There is no instruction given to workers as to the necessity of washing their hands or of not eating their food with soiled hands, in fact no warnings whatever are given in the majority of the establishments. Whatever notices or cards are found in the chemical establishments do not seem to serve as a means of instruction, but rather as an extenuation for the manufacturer, placing the onus upon the employee in case of a suit for damages.

I found a number of foreign workers at very hazardous occupations in chemical plants who were entirely ignorant of the English language; and there was no one in the establishment who could instruct them, except in sign language. It is evident that precautions to be of any value must be given in language that is understood by the employee; instruction which is adapted to his intelligence should be given a beginner, and the danger of his calling should be thoroughly impressed upon his mind. Repeated instruction should be given as to the means of preventing evil consequences to himself.

Hours of Labor:

In Chapter VII will be found some data as to the hours of labor of 132 workers in the most dangerous processes of the chemical establishments at Niagara Falls, New York. The hours of labor in the chemical trades do not differ from those in any other trade. In some establishments the ten-hour work day is exceeded by one or two hours; in others night work and double shifts are regularly enforced.

Wages:

The work in most of the chemical establishments is, as has been pointed out before, mostly unskilled labor, requiring strength and endurance rather than brains and skill. The wages of the unskilled workers differ according to the labor market and to the location of the plant. I have found the wages as low as \$1.25 per ten-hour day paid to workers employed in a close dark attic of a chemical plant at Utica at the laborious task of shoveling ammonium salts and coal-tar by-products of illuminating gas, to \$2.25 per day in a chemical plant on Long Island. The average wage would probably be about 17½ cents an hour.

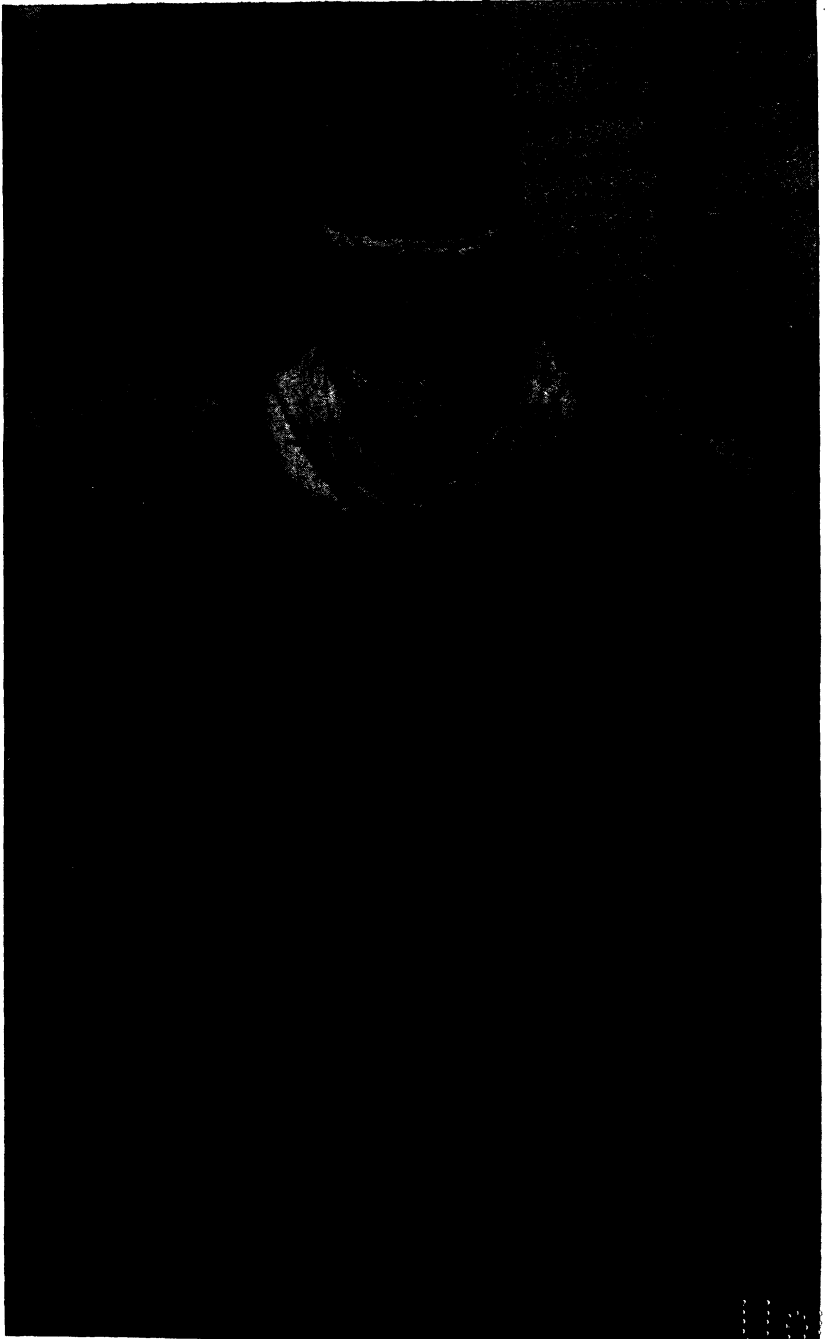
Medical Attention, etc.:

Except in some of the lead works in New York City, no medical examination or supervision has been found in any of the chemical establishments inspected. There are some establishments which have a medical chest or a first-aid chest which is usually in the care of a foreman or a laboratory worker, and is used in case of emergency. In one of the chemical plants — and this I believe is the only one in the State — we found a pulmotor apparatus for resuscitation in case of “gassing.” We found also in some of the establishments solutions ready to be used in case of slight burns and scalds. As has been noted, no preliminary systematic examination or later periodical examination has been found in any establishment in the State. Even in the lead factory referred to above, which has its medical officer, the value of the medical supervision may be judged by the fact that this officer admitted on the stand at a public hearing that he did not know whether the plant provided hot water for the use of its employees.

Special Clothing, Protectors, Respirators, etc.:

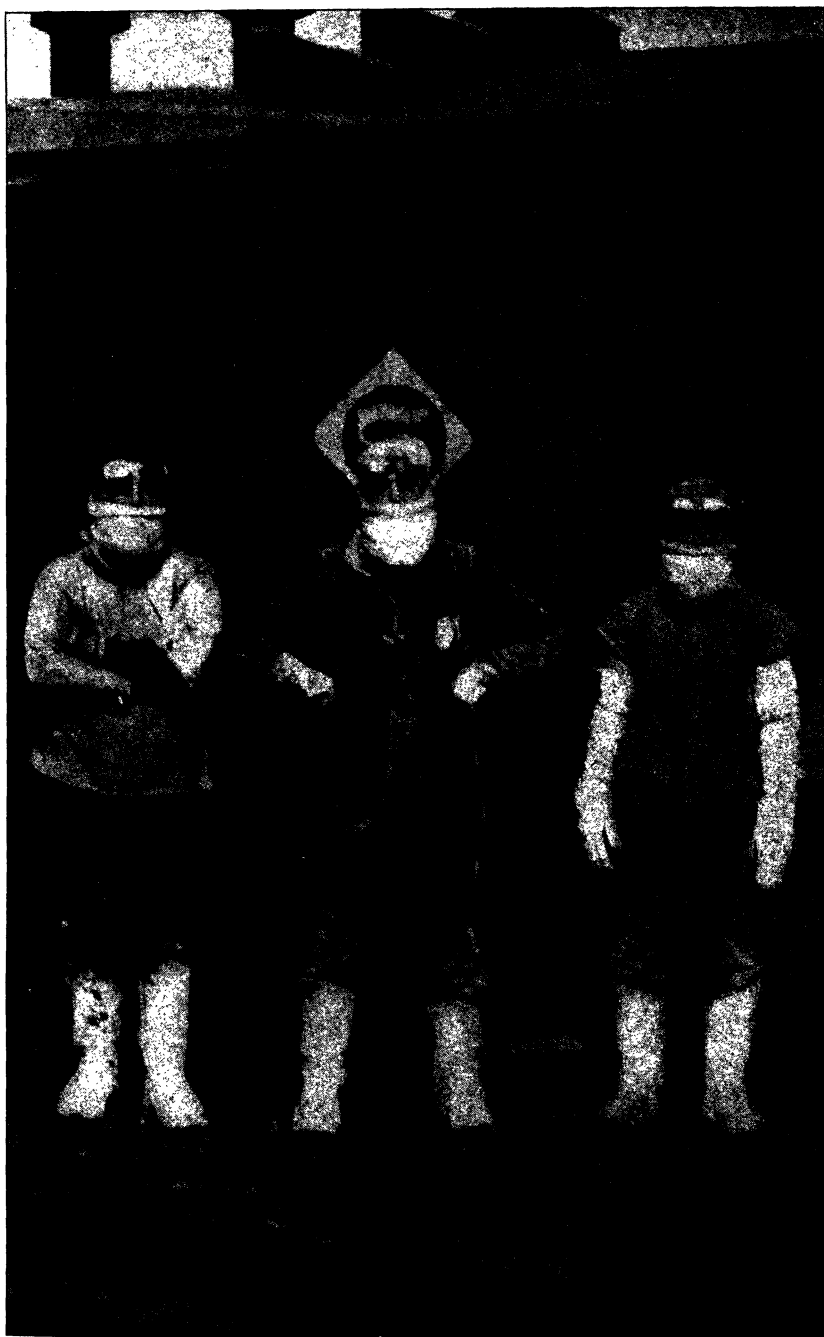
In none of the factories inspected were the workers provided with special working clothes by their employers. Whatever special clothing was worn by the employees was usually bought or devised by themselves and often consisted of overalls and aprons; in a few cases the workers protected themselves by means of newspapers or rags folded around their legs and arms, while some improvised for themselves aprons, etc. The heads were seldom covered by special caps; in a majority of cases workers provided their own gloves, but few establishments furnishing them. As may be seen in some of the photographs, the workers while doing certain work stuffed their nostrils with cotton; others used spectacles or goggles to protect their eyes. These goggles are furnished by the employers in a few establishments, but in others have to be bought by the workers themselves.

In respect to all these protective appliances there is a tendency on the part of managers and foremen to blame the employees for not using them. Some of these managers claim that they instruct the workers in their use and insist upon their use, but



PLANT B, NIAGARA FALLS, N. Y.

Packers of "bleach" or chloride of lime.—Despite protectors worn over mouth, suffer from throat and lung troubles, nausea and general debility.



PLANT B, NIAGARA FALLS, N. Y.

"Bleach" packers whose work in chloride of lime wears out a pair of shoes in five weeks and trousers and coat in a month.

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that the workers in their ignorance wilfully disregard the instructions and refuse to use them unless under direct supervision. On the other hand, many of the employees who were interviewed claimed, that in the first place, they themselves had to buy these protectors and their cost was prohibitive; secondly, that these protectors are very easily destroyed and a constant supply is needed; thirdly, that it is very awkward to wear them and that they make the work more difficult; fourthly, that their use seriously interferes with quick work; and fifthly, that they do not understand the necessity for their use. The use of these protectors is not enforced by managers and is generally neglected by employees. Only in isolated cases were they in regular use.

How much the use of protective appliances in dangerous trades can be of value may be judged by the marked reduction in industrial diseases and number of accidents in establishments where they are universally and uniformly used. Such establishments may be found in States where the Workmen's Compensation Acts have already been introduced, and where it is to the direct interest of the owners to prevent accidental injuries and occupational diseases.

This is especially the case in the compulsory use of respirators by the workers. There are a number of processes and occupations where the use of a respirator as a preventive is absolutely essential, and yet we have found very few establishments where these are regularly used by the workers. Neither in sand-blasting nor in lead works nor in any other occupation where the presence of poisonous gases and excessive amounts of dust vitiate the air have respirators been uniformly used. The managers and owners resort to the same plea, viz.: the ignorance of the worker and his wilful abandonment or neglect of these protective appliances. Few of these managers provide their employees with them, and still fewer make their use compulsory.

On the other hand, I have found the use of respirators uniform and compulsory in one large establishment in Chicago where, after the promulgation of the Compensation Act, the owners of this establishment introduced a strict medical supervision of their employees and made the use of respirators and other protective devices conditional to employment, and their disuse a

cause of discharge. The result is that they have reduced their cases of lead poisoning from seventy-seven in July, 1911 to 0 in the same work in 1912, in a contingent of 400 to 500 employees. It is true that the use of no protective device is so irksome to the worker as that of the respirator, but there is no protection which is so imperatively needed to the preservation of health in certain establishments. As may be seen in the photographs, the workers in the bleach chambers use a special "muzzle" which they have found by experience is the best for the purpose. This muzzle is not furnished by the employers but is made up by the workers.

Mortality and Morbidity of Workers:

We meet with great difficulty in estimating morbidity rates and mortality rates of chemical workers in the United States because the classification of the chemical trades is not yet uniform. The absence of medical supervision and sickness insurance among the chemical workers makes it impossible to estimate the morbidity rate among them. The change of work and the constant shifting of the workers from one part to another make the mortality rates of very little use in this matter.

In foreign countries, and especially in Germany, where chemical workers are well organized and where, owing to the State Insurance Act, sickness insurance funds exist in every establishment, there has been gathered with the statistics on morbidity and mortality, statistical data on the "occupational" diseases and death rates among chemical workers. In the extracts and tables given in chapter VII an attempt is made to give a partial review of such statistics. There will be found also additional data as to the number and kind of accidents in the chemical trades.

PLACES WHERE CHEMICALS, PAINTS AND ILLUMINANTS ARE MANUFACTURED



GRADE OF CLEANLINESS

Inadequate light in shops
Mechanical ventilation
Special devices



LIGHT AND VENTILATION

Adequate washing facilities
Separate lunch rooms
Separate dressing rooms



SPECIAL CONVENIENCES

* The % for the separate dressing rooms is taken of the total number of establishments (64) investigated in 1912. 1911 is not taken into consideration.

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IV.

PROPHYLAXIS.

We have seen that many branches of the chemical industry and many processes therein may be justifiably called "dangerous," and that the industry as a whole is responsible for various occupational diseases and many industrial accidents.

The problem of eliminating industrial diseases and industrial accidents is closely interwoven with other economic problems. The question which forces itself into the mind of the investigator is whether the diseases and accidents are inevitably a part of the industry or not, that is, whether the industry cannot be carried on without its concomitant dangers and its annual revenue of disease and death. It has not as yet been clearly demonstrated that the crux of the problem is whether we must have an industry with diseases and accidents or else no industry. It has not as yet been demonstrated that industrial diseases and accidents are absolutely unavoidable and are the price we have to pay for the very existence of industry. It has, on the other hand, been demonstrated that a great many, if not a majority, of the industrial diseases and accidents may be avoided and prevented; and that even in the most dangerous processes, where there seems to be no possibility of eliminating danger, some methods have been found to preserve the life and health of the workers.

Undoubtedly much of the trouble is due to ignorance, especially that found among those whose duty it should be to properly study industrial hazards; and to the fact that in many of the establishments the dangers of the occupation are not as yet understood. But ignorance is only partially responsible for the absence of protection of workers in dangerous industries. There is as yet a lamentable and culpable neglect of the workmen's health in all industries, but especially in the chemical industry. There is still too much eagerness for increased production and augmented profits; there is still too much inexcusable contempt for the life and health of operatives.

If an infinitesimal part of the ingenuity, intelligence and thought which has been and is at the present time devoted to the improvement of machinery, the invention of mechanical

devices, and the discovery of chemical secrets were devoted to inventions for the proper protection of the worker and for the preservation of his life and health, the danger from industrial diseases and accidents would have become altogether negligible. The immediate rewards from such inventions would perhaps be comparatively small, but they would eventually be of inestimable value to mankind.

WHAT ARE THE PRINCIPLES OF PROPHYLAXIS IN THE DANGEROUS TRADES?

I. *General Sanitary Conditions:*

In the first place, the general sanitary conditions in all dangerous trades should be as nearly ideal as possible. The insanitary conditions discovered in the various industries by the investigators are inexcusable in any industry, and criminal in the chemical trade. There is no need to emphasize the necessity for proper construction and safeguarding of machinery, proper lighting of factories, adequate illumination of shops, cleanliness of walls, floors and ceilings, abundance of drinking water and washing facilities, provision for adequate toilet accommodations, dressing rooms, lunch rooms, baths and other sanitary conveniences. One-half or perhaps more of the industrial diseases could be avoided by the proper observance of sanitary precautions.

II. *Use of Dangerous Material:*

It has been proved that the necessity for the use of a material which is inherently dangerous to life and health is in many cases open to question. By the disuse of mercury in the production of mirrors, by the prohibition of dangerous phosphorus in the match industry, and by the substitution of innocuous zinc for carbonate of lead and of leadless glazes in pottery, the principle of substituting non-dangerous materials for dangerous has been established. While the substitution is not yet practicable in all dangerous processes of manufacture, yet it is a consummation devoutly to be wished. The mixing of poisonous ingredients with oils or water has also greatly modified the dangers



PLANT G, NIAGARA FALLS, N. Y.
A bleach chamber worker.

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from dust. In this way a good beginning has been made towards building up non-dangerous industries.

III. *Mechanical Processes:*

In a number of industries there has been constant progress in the invention of new mechanical devices and processes by which a great many dangerous elements are removed by automatic and mechanical improvements, which have reduced the dangers of many processes and materials to a negligible minimum. Such automatic mechanical processes are already in use in many dangerous trades and have eliminated much of the disease previously incident to these processes.

IV. *Safeguarding of Machinery:*

It will be generally conceded that in all industries the dangerous appliances and mechanical processes may be rendered entirely harmless by adopting preventive methods and protective mechanism. There is hardly a process involving peril to the worker in any of the mechanical trades which cannot be made safe if given proper study.

V. *Removal of Dust, Gases and Fumes:*

No one doubts that the effects of dust, gases and fumes upon the workers is due to their inhalation or ingestion. There is also not much doubt that the presence of dust, gases and fumes in any industry is not absolutely necessary and may be avoided and prevented. The progress of the science of ventilation has reached a state where dusts and fumes may be taken away at their source, removed and destroyed or used up. That this has not as yet been done in all the dangerous establishments is due not to technical impossibilities but either to ignorance of the importance of ventilation or reluctance to expend the necessary funds for the installation of mechanical devices.

VI. *Hours of Labor:*

The more dangerous the trade, the shorter should be the hours of labor. This principle has already been applied to caisson work. It should be extended to other dangerous trades and processes.

VII. *Personal Prophylaxis of Workers:*

No one, of course, has disputed the possibility of preventing many of the occupational diseases and accidents by providing the workers with proper clothes, protective covering for the exposed parts of the body and spectacles or goggles, and by insistence on the use of respirators where these are absolutely indicated.

VIII. *Compensation:*

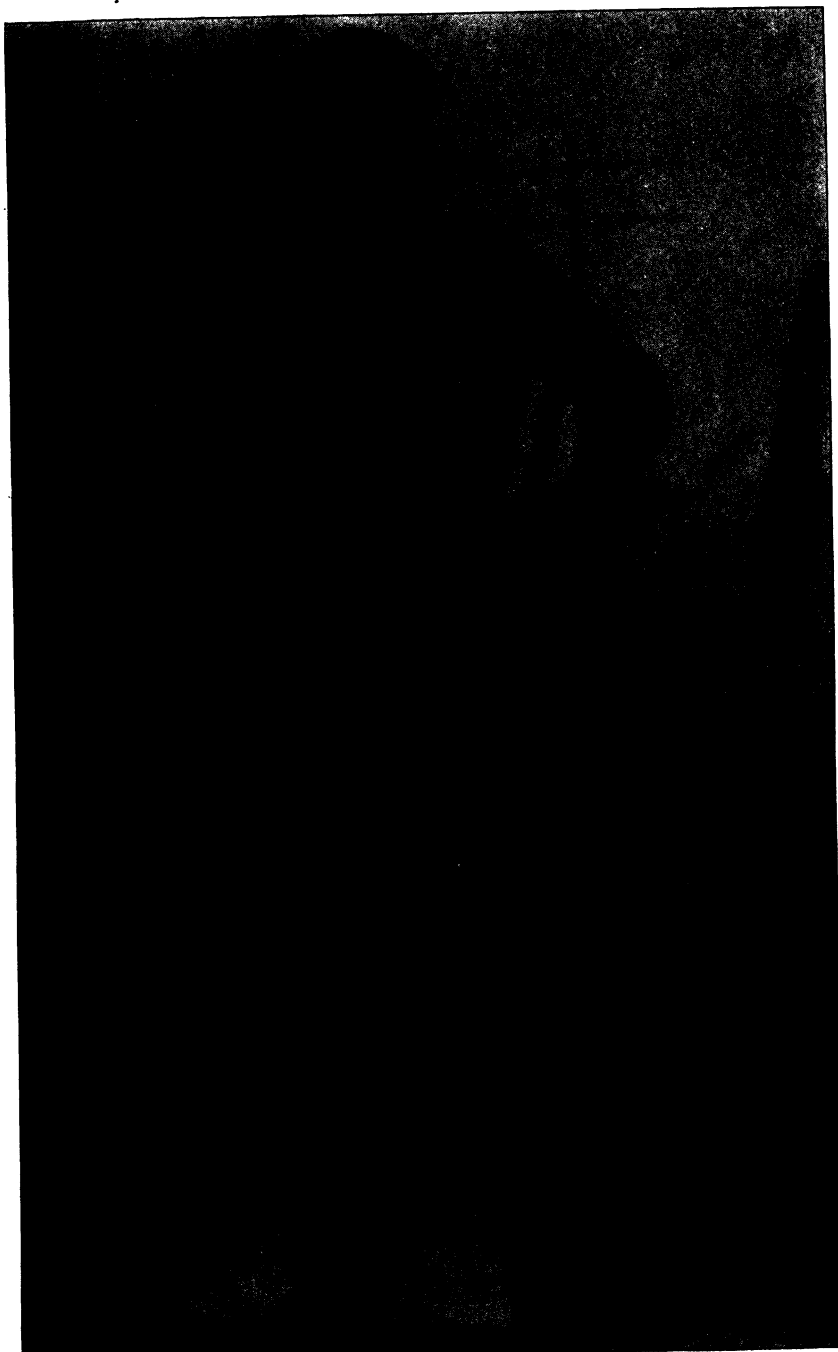
One of the best means of prophylaxis against dangerous trades is a proper system of compensation for industrial diseases and accidents.

IX. *Medical Supervision:*

Many occupational diseases may be prevented by proper medical supervision in industrial establishments. Such supervision, however, must not be perfunctory, non-uniform and unregulated by the State, but should be thoroughly organized, uniform and under direct supervision of the Department of Labor through the proper medical factory inspectors.

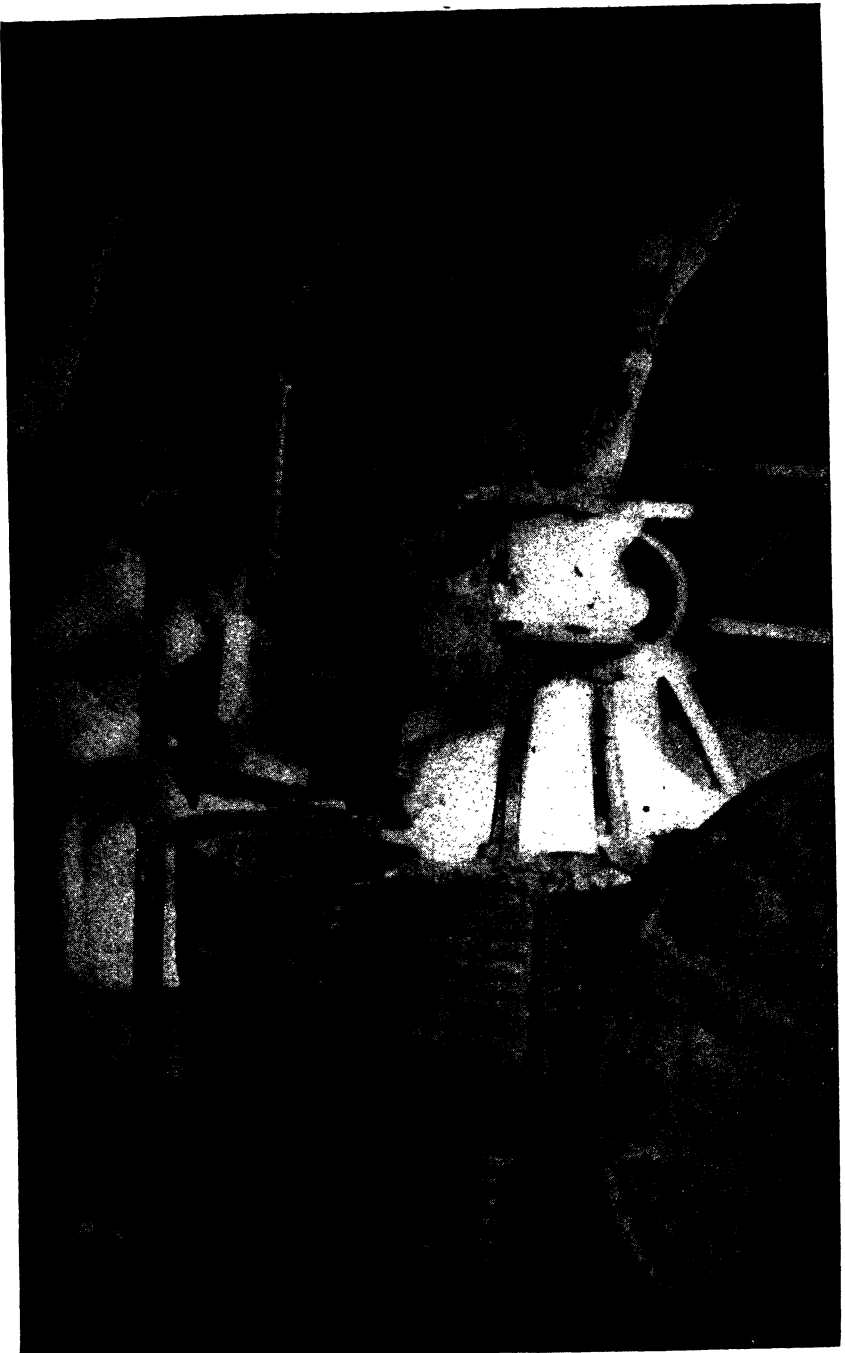
A medical supervision to be of effect must embrace the following features:

- (a) Compulsory appointment of attending physicians in each dangerous trade establishment with the advice and consent of the Chief Medical Factory Inspector of the Department of Labor.
- (b) Uniformity in all record cards and methods adopted by the physicians.
- (c) Regular supervision of the physicians by the Medical Factory Inspector and the discharge of the said physician for incompetency on the recommendation of the State Medical Factory Inspector.
- (d) A rigid routine medical examination of all applicants for work in dangerous establishments.
- (e) Regular periodical physical examination of all workers at stated intervals.



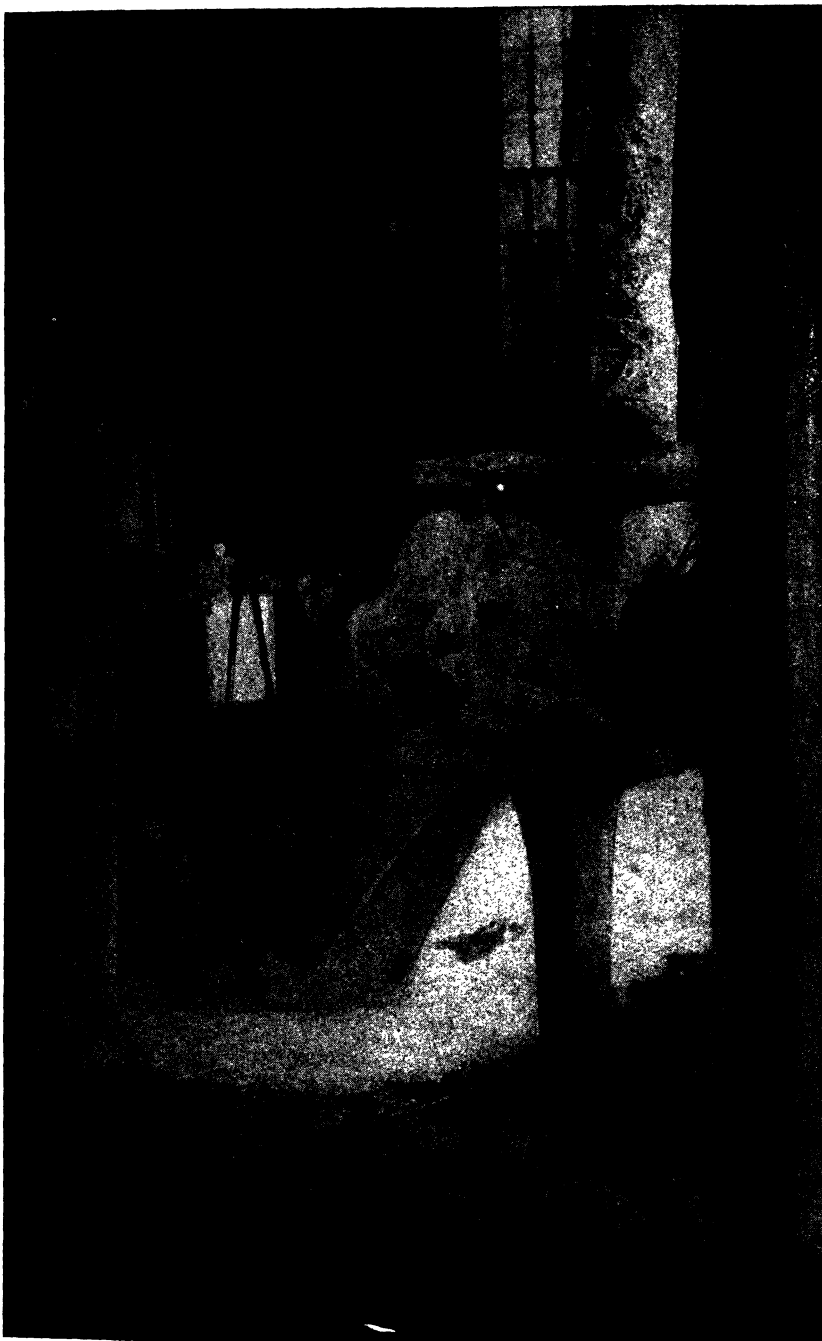
PLANT G, NIAGARA FALLS, N. Y.
Bleach chamber worker.

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PLANT F, NIAGARA FALLS, N. Y.

Mill room where machinery and men are covered with a fine penetrating white dust from the lime ground in a grinding machine.



PLANT F, NIAGARA FALLS, N. Y.

Mill where lime is ground.—Despite precautions to carry off dust, it has settled like a white blanket over everything near.

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- (f) Treatment and discharge of all employees who are found suffering from any ailment incompatible with the work of the establishment.
- (g) Prompt medical aid and treatment of all cases needing the same.

X. *Licensing of Dangerous Trade Establishments:*

Strict regulation of all dangerous trade establishments by the State can be obtained only by a system of licenses for all such industries. No establishment which has not applied for and received a license from the Department of Labor (such license being revocable by said Department for just cause) should be allowed to exist.

XI. *Special Rules:*

The conditions in many industries vary so greatly, and the factors affecting the health and safety of the workers are so dissimilar not only in different industries but in different parts of the same establishment, that no general laws can be promulgated which would be applicable to all industries and all establishments, or which would cover adequately the many elements of danger and hazardous processes.

Each industry and each process in an industrial establishment must be studied separately in order to determine the dangerous elements in each. Only after such a study and investigation can protective devices be introduced which will adequately prevent occupational diseases and industrial accidents. It is therefore recommended that the Legislature empower the Department of Labor to formulate special rules and regulations for the control of each industry and part of industry and for each establishment and part of establishment. Such special laws are a part of the legislative codes in foreign countries, including Great Britain.

Such powers have been given to the Industrial Commission of Wisconsin, and such power should be given to the Commissioner of Labor in this State, acting with the counsel of an advisory board.

XII. *Education:*

No regulation, no licensing, no supervision or compulsion will ever take the place of the gradual spread of intelligence among workers and their proper education in the dangers of their trades and occupations. Such education is a necessity for the prevention of diseases and accidents among workers. It is the obligation of the state in co-operation with the industry to provide for the proper instruction of industrial workers.

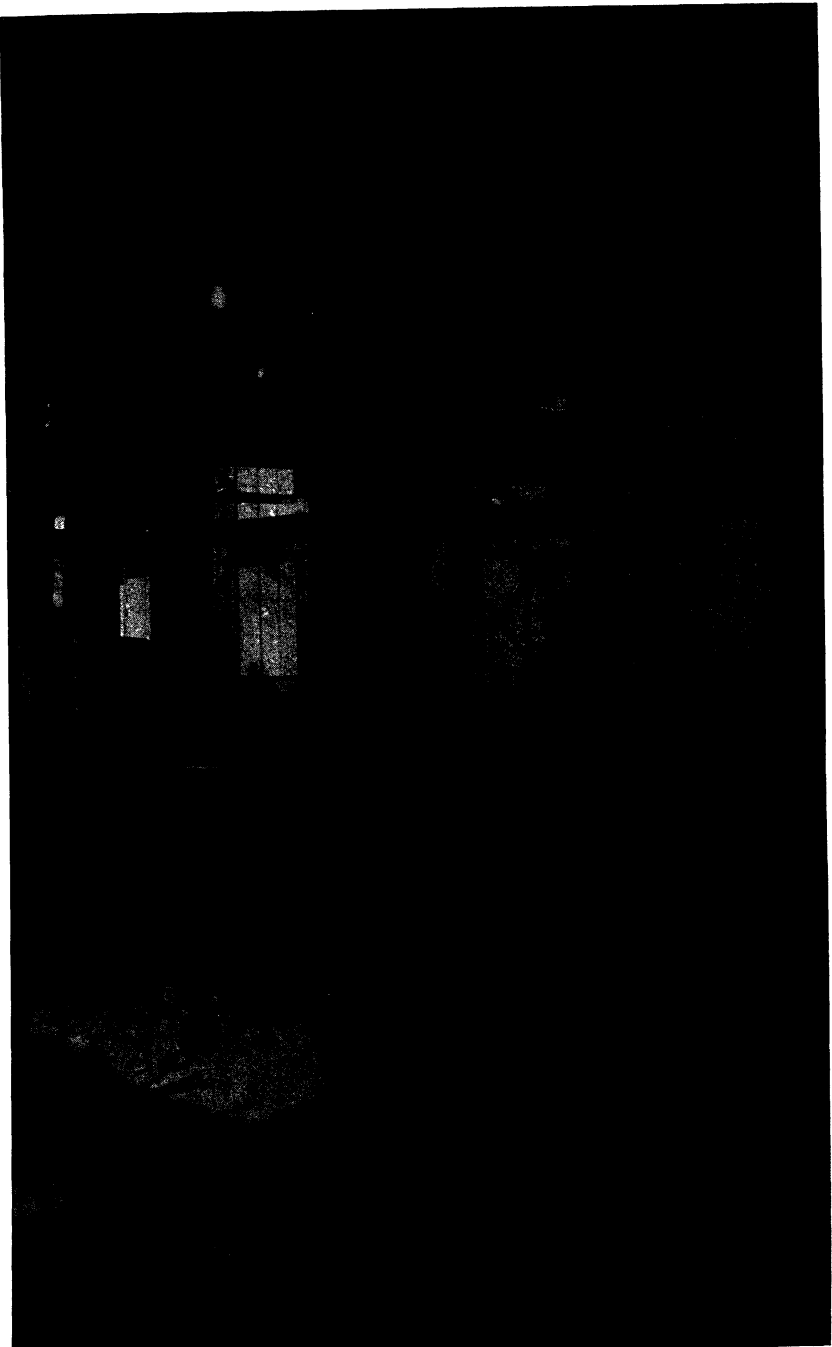
Industry and its promoters have no right to expose a single worker to any danger of which he is ignorant. The worker should be educated in the elementary school, in the trade school and in the technical school. Every establishment where any dangerous elements are present should have a school of instruction, where every new worker or apprentice should be made thoroughly conversant with all the dangers and processes and materials and the power of the protective devices in the establishment before he is allowed to work.

Moreover, the State by means of lectures in public schools, evening schools, by means of traveling exhibits, bulletins, through the press and through labor organizations, should endeavor to spread the light of knowledge on industrial conditions among all the workers in the State, and especially among the workers who are directly connected with the dangerous trades.



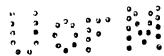
PLANT F, NIAGARA FALLS, N. Y.
Using pneumatic hammer to chip off outside of hard-baked carbide "pig"—
Room cloudy with black dust; much noise.

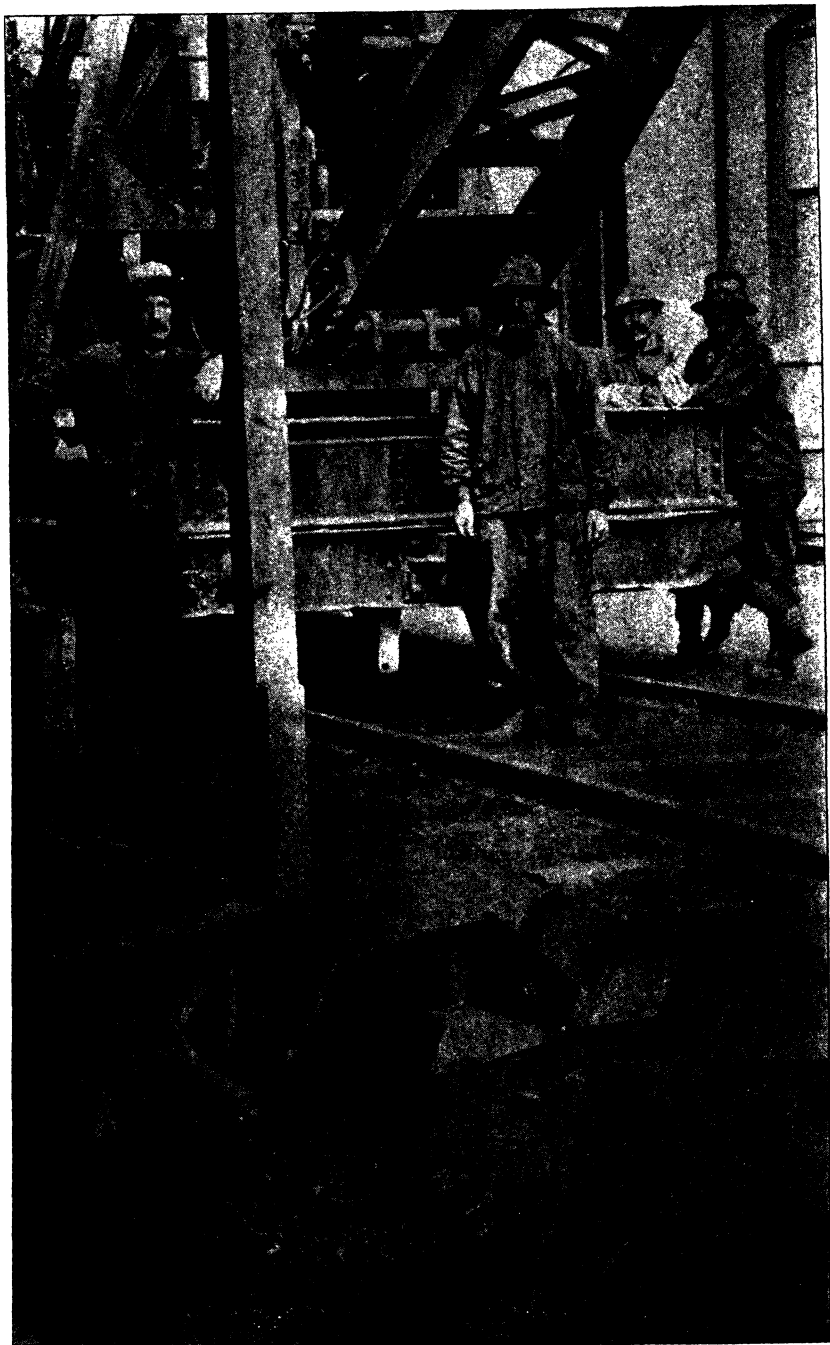
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PLANT F, NIAGARA FALLS, N. Y.

Room where carbide is prepared for market after baking in furnace.—Thick black clouds of fine dust fill the air.





PLANT F, NIAGARA FALLS, N. Y.

1, Derrick car operator; 2, Carbon fitter; 3, "Hookers" of carbide pigs;
4, "Tappers" of furnaces, all exposed to dust.

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CHAPTER V

THE TOBACCO INDUSTRY.

WITH A REPORT OF A MEDICAL EXAMINATION OF SIX HUNDRED FEMALE TOBACCO WORKERS.

I.

THE INDUSTRY.

Tobacco products to the amount of five hundred million dollars (\$500,000,000) are annually consumed in the United States.(a) "In New York State the tobacco industry in 1840 employed 569 workers, who turned out a product valued at \$831,570. From that time the industry grew, until now it surpasses in magnitude any of the food-producing trades in the State."

According to the thirteenth census there were in 1910 upwards of 3,000 factories, employing the 30,019 wage-earners and producing \$76,662,000 worth of cigars, cigarettes and other tobacco products, there being several factories which had in their employ several thousand workers. "Pennsylvania slightly leads in the number of cigars manufactured, but New York makes more than half of all the cigarettes. New York ranks first in both branches of the trade and Rochester fourth in the cigarette business. In making finecut chewing tobacco, New York city ranks fourth among the leading centers of the country, Rochester fifth, Utica ninth and Albany tenth, while in the manufacture of smoking tobacco New York city ranks third."(b)

(a) The Tobacco Industry in the United States. By Meyer Jacobstein, p. 47.

(b) Growth of Industry in New York State, Dept. of Labor Report (1902), p. 154.

Table No. XVI illustrates the growth of the tobacco industry in New York State.

TABLE NO. XVI.
CIGARS AND OTHER TOBACCO PRODUCTS IN NEW YORK STATE.

	1910	1905	1900	1890	1880	1870	1860
Total number of establishments.....	3,371	3,543	3,097	2,888	1,728	1,123	337
Wage earners.....	30,019 ¹	33,946	27,071	30,299	22,226	10,243	2,028
Men.....		17,889	15,788	20,205	14,441	6,628	1,968
Women.....		15,809	11,077	9,530	6,558	2,064	60
Children under sixteen.....		248	206	564	1,227	1,551	
<i>Percentages:</i>							
Men.....		52.7	58.3	66.7	65.0	64.7	97.0
Women.....		42.6	40.9	31.4	29.5	20.2	3.0
Children.....		0.7	0.8	1.9	5.5	15.1	.....

¹ Not reported separately in Bulletin.

² Not reported.

1910 N. Y. Bulletin of Manufactures, p. 59.

1905 Manufactures, Part I, p. 476.

1900 Manufactures, Part III, pp. 647, 661.

1890 Same as 1900.

1880 Manufactures, p. 158.

1870 Wealth and Industry, p. 480.

1860 Manufactures, p. 413.

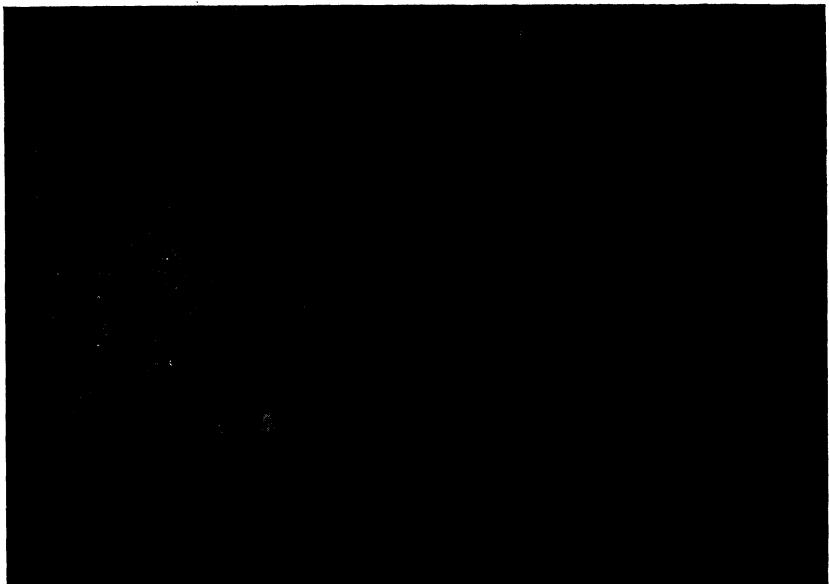
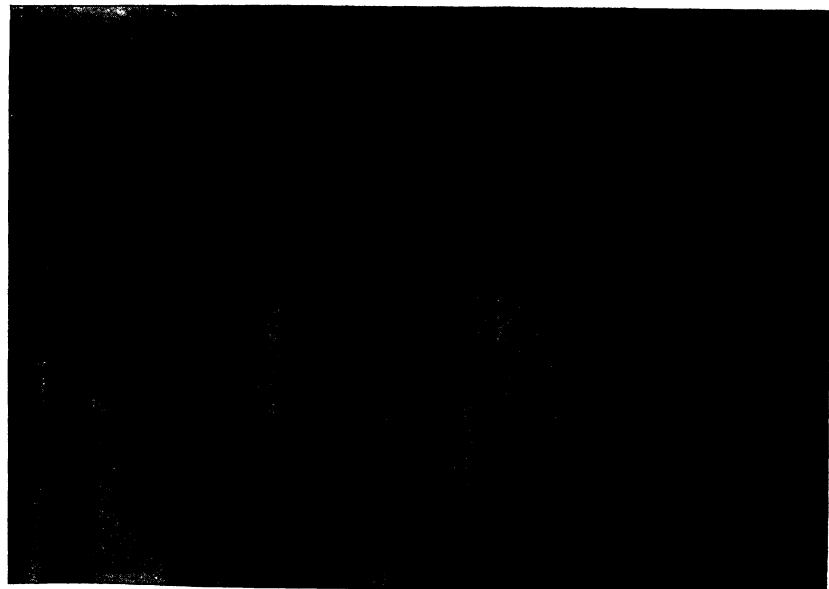
II.

SANITARY CONDITIONS IN THE INDUSTRY.

Within the last two decades the sanitary conditions in the tobacco industry have been greatly changed. Years ago these conditions were of the worst, and it was notorious as a tenement house trade. The evils were described in many of the reports on the subject, and during the many agitations against tenement house cigar manufacturing.

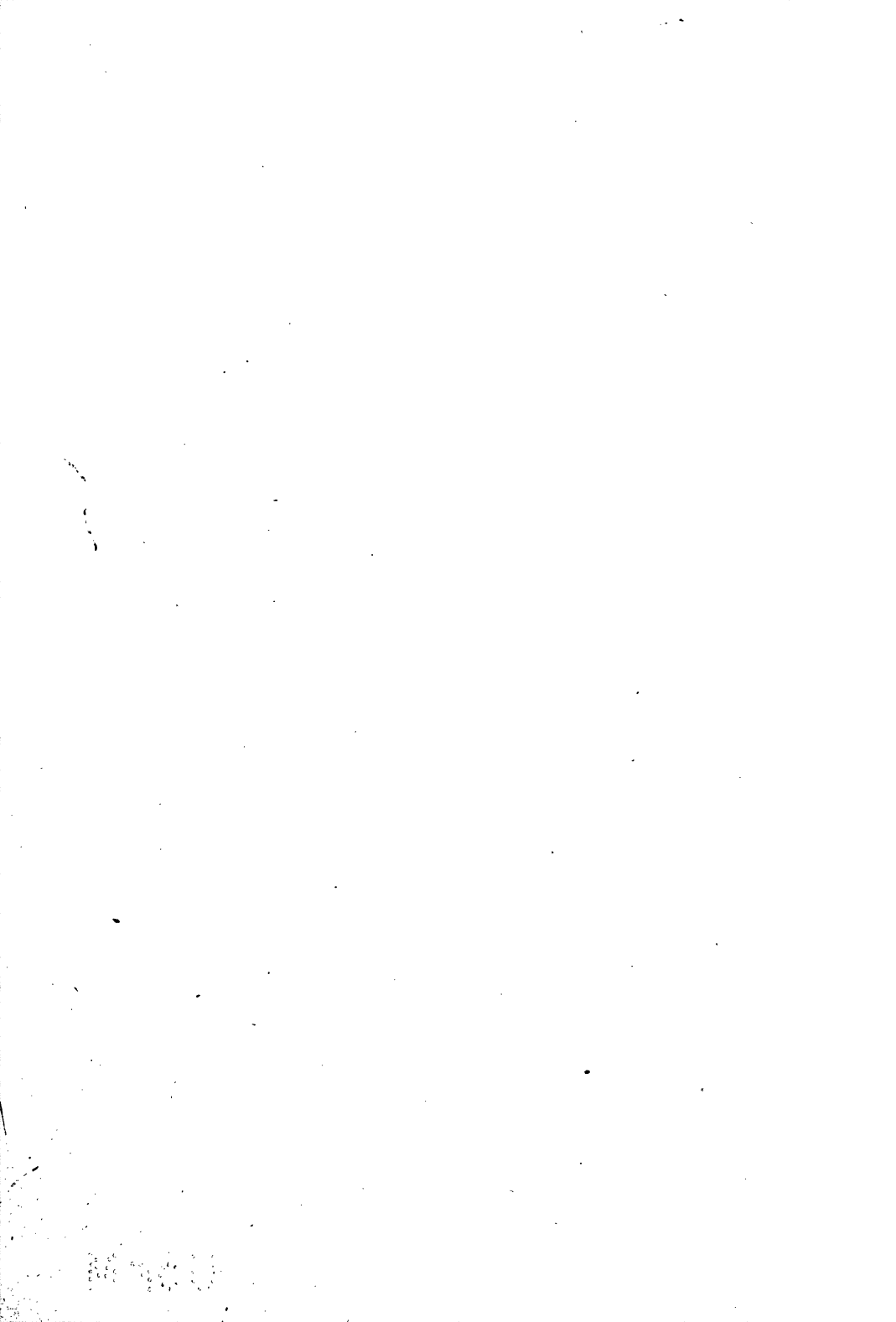
The enactment of the "tenement house cigar law" was probably the first important labor legislation in this country, and although soon declared by the Supreme Court to be unconstitutional, it was destined later to become a part of our statutes.

Through the introduction of machinery into the manufacture of cigars and cigarettes, perhaps a greater blow has been given to the tenement house industry and to the small manufacturers than by the "tenement house cigar law." The industry had to be transferred to modern factories. Human labor was replaced by machinery and great changes had to be made in the general conduct of the trade. A large number of men were replaced by



CIGAR SHOP IN CELLAR OF TENEMENT, MULBERRY STREET, NEW YORK CITY.

Shows piles of cigars and old tub in which odds and ends of tobacco are kept, and two stoves for cooking, etc.—Men work on cigars and keep the stock in this room.



machines, and still a larger number were displaced by women. Thus at present 57.1 per cent of all the employees in New York cigar factories are women, according to statistics founded on our investigations. In the cigarette industry the percentage of women is much greater. The ages of the women range from fourteen to sixty-six. Many of them are married and have families.

While the sanitary conditions of many of the tobacco factories have become better than those which were prevailing earlier in the period of home manufacture, a still greater improvement has lately been made by the concentration of the industry in the hands of a few owners, who have been enabled to build and equip large establishments with modern sanitary improvements.

Our investigation included 251 tobacco factories consisting of 472 separate shops. Only seventy shops of the smallest type were located in converted tenement houses. It is in these shops that the conditions were the worst.

The light in most of the factories examined was fair, but ventilation was invariably found to be bad. The dangerous elements in tobacco factories are the dust, fumes and the odors of the tobacco.

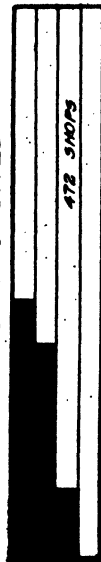
No attempt has been made in the majority of the establishments to remove these dangerous elements or even to minimize the evil. Although with very few exceptions windows were the only means of ventilation in the factories inspected, they were kept closed in most of the establishments, even in summer. A certain amount of humidity in the air is necessary in order not to have the tobacco too dry — hence the desire to keep windows closed. Mechanical ventilation was found in 13.1 per cent of the shops and special devices were provided in 14.5 per cent.

Even when provided with improved means of ventilation, the conditions were but little better. Our inspectors complained very much of the oppressive air which they were compelled to breathe while on their tour of investigation. The odors, fumes and dust of tobacco, to those unaccustomed to the work, cause headache, nausea and loss of appetite, and it takes considerable time to become inured to the prevailing air conditions.

In the establishments inspected we found 8,900 women and 200 minors under sixteen. Whatever may be the opinion of the effect of working in tobacco factories upon men and women, there is no doubt that minors under sixteen are injuriously affected by such work. This may be partly due to the usual work intrusted to minors, tobacco stripping, which is often a very dusty process.

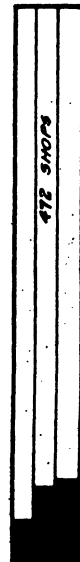
Table No. XVII gives the result of the sanitary inspection of the 251 establishments.

TOBACCO FACTORIES



Good
Poor
Bad
Not reported

GRADE OF CLEANLINESS



Inadequate light in shops
Mechanical ventilation
Special devices

LIGHT AND VENTILATION



Adequate washing facilities
Separate lunch rooms
Separate dressing rooms

SPECIAL CONVENIENCES

* The % for the separate dressing rooms is taken of the total number of establishments listed investigated in 1912. 1911 is not taken into consideration.

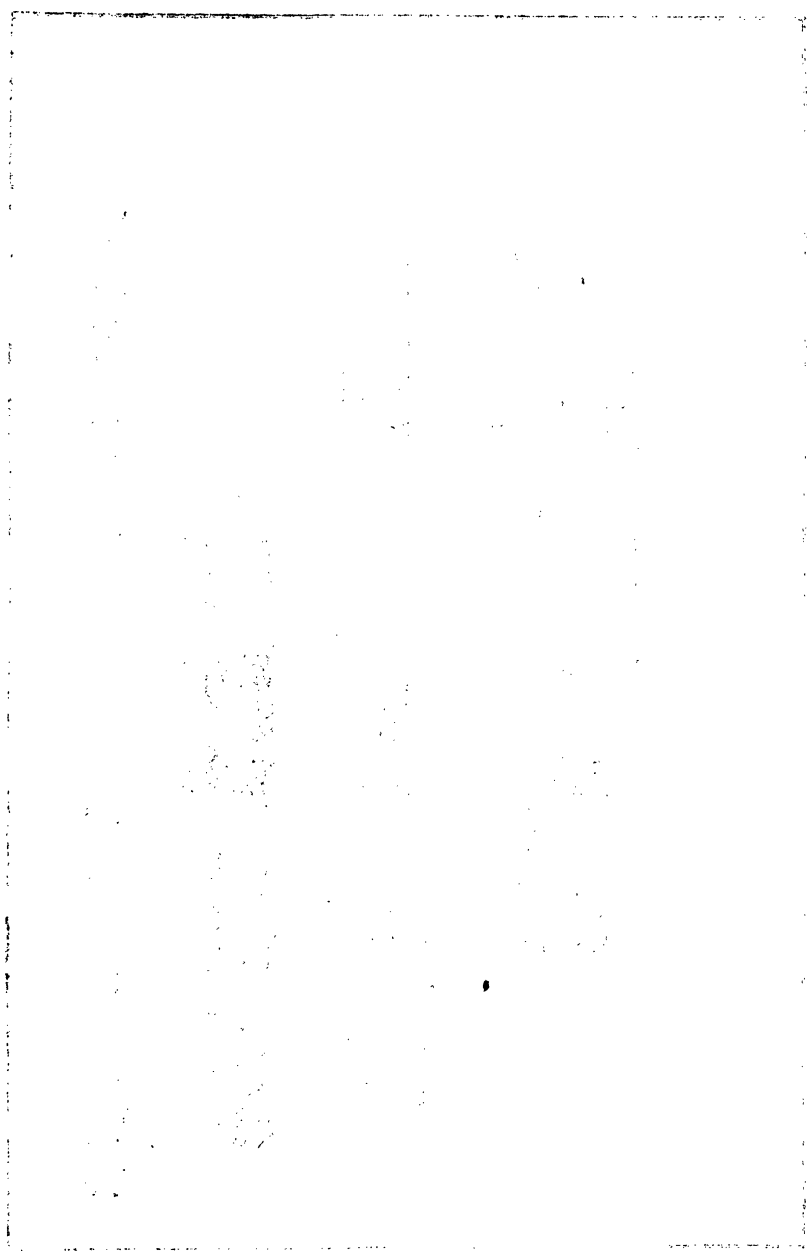


TABLE NO. XVII.
SANITARY INSPECTION OF 251 ESTABLISHMENTS—TOBACCO, 1911-1912.

Number of establishments.....	251
Number of shops.....	472

	Number of Establishments.	Per Cent.
<i>Type of Building:</i>		
Special factory.....	49	19.5
Loft.....	132	52.6
Converted tenement or dwelling.....	70	27.9
Not specified.....	.....	.....
Total.....	251	100.0
<i>Wage Earners:</i>		
Men.....	6,494	41.6
Women.....	8,900	57.1
Minors under sixteen.....	200	1.3
Total.....	15,594	100.0
<i>Light and Ventilation:</i>		
Inadequate light in shop.....	35	7.4
Shops using mechanical ventilation.....	62	13.1
Shops using special devices.....	69	14.6
<i>Cleanliness of Shop:</i>		
Good.....	225	47.7
Poor.....	186	39.4
Bad.....	60	12.7
No report.....	1	0.2
Total.....	472	100.0
<i>Toilets, Location:</i>		
Yard.....	9	1.9
Hall.....	77	16.3
Shop.....	355	75.2
Elsewhere.....	29	6.2
No toilet.....	2	0.4
No report.....	1	0.2
Total.....	473 (b)	100.0
<i>Light:</i>		
Good.....	219	46.4
Poor.....	127	26.9
Bad.....	106	22.5
No toilet.....	2	0.4
No report.....	18	3.8
Total.....	472	100.0
<i>Ventilation:</i>		
Good.....	187	39.6
Poor.....	141	30.0
Bad.....	124	26.2
No toilet.....	2	0.4
No report.....	18	3.8
Total.....	472	100.0
<i>Cleanliness:</i>		
Good.....	191	40.5
Poor.....	160	33.9
Bad.....	98	20.8
No toilet.....	2	0.4
No report.....	21	4.4
Total.....	472	100.0
<i>Establishments Having Special Conveniences:</i>		
Adequate washing facilities.....	225	89.6
Separate lunch room.....	9	3.6
Separate dressing rooms.....	121	80.1

(b) One shop had toilets both in shop and hall.
The percentage of dressing rooms is taken from the total number (151) investigate

III.

THE HEALTH OF TOBACCO WORKERS.

The tobacco trade has always been regarded as an unhealthy industry. The occupational dangers of no other trade have caused so much controversy, and to this day, opinions are divided as to the effect of tobacco work upon the operatives.

Ramazzini, C. Turner and Patissier have referred in their writings to the ills suffered by tobacco workers; Ramazzini, writing in 1708, emphasizes the effect of tobacco dust upon the digestive organs. A. Wynter Blythe, in speaking of the relative frequency of tuberculosis among workers in the "dusty trades," says that out of 100 patients suffering from phthisis, thirty-six per cent were cigarmakers. The mortality reports in the United States census show that cigarmakers rank with compositors and stonecutters in the tuberculosis death list. The federal statistics state that 477 out of every 100,000 are victims of tuberculosis. (c) This rate is much higher than in many other trades.

Opinions vary so widely as to the occupational effect of tobacco work upon women that one is at a loss to know whom to believe. It would seem, after a review of the literature on the subject, that wherever there is no individual susceptibility to the effects of tobacco fumes, workers suffer little from acute trouble after the first weeks of initiation. According to Kostial, of 100 cigarmakers seventy-two were ill during the first six weeks of their work.

Spanish, French, Cuban and American statistics on female employees in tobacco factories support the idea that the occupational effects of this work are frequent miscarriage, high rate of infant mortality, defective children and infantile convulsions. (d) Patissier, Richardson, James, Kostial, Morat and Brodie have noted menorrhagia among female tobacco workers.

The symptoms of chronic tobacco toxemia are dyspepsia, anaemia, heart weakness resulting in vertigo, and various nervous troubles. Toxic amblyopia has been considered by some distinguished authorities as a result of tobacco work. Dr. Dowling, of

(c) Address of Geo. W. Perkins, President of the International Cigar-Workers Union, 1911.

(d) Degeneracy — Its Causes, Signs and Results, by Eugene Talbot, M. D.

Cincinnati, made in 1892 an examination of 150 tobacco workers in order to discover cases of this eye affection. Results of his investigation would indicate that amblyopia is caused by the use of tobacco, and is not incidental to the processes of manufacture. Results of the physical examinations made by Dr. Dembo, of the New York State Factory Commission, confirm this impression.

In England a recent report makes note of cases of dermatitis caused by the manufacture of roll tobacco. This sort of eczema has been observed from time to time among tobacco workers. It results from the handling of the leaf.

The Children's Employment Commission of 1841 in England refers in its report to the moral condition of children in tobacco factories. The Commission found the state of the children employed in the trade very low. The Children's Employment Commission of 1865 recommended that tobacco manufacturers should be placed under the Factory Acts' Extension Act. Dr. Legge made an inspection in 1903 of eighteen tobacco factories in London, Liverpool, Glasgow and Bristol. He found women working in the "steaming room" in both Liverpool and Bristol, and strongly recommends the prohibition of women working in such rooms. Another important investigation was made in England under the direction of the Chief Inspector of Factories in 1906.

In France the tobacco trade is a government monopoly and under strict government supervision.(e) They have a ten-hour day, with a wage of five francs a day for men and three francs for women. There are over twenty large factories in the country, three of which are in Paris. In 1892 there were 1,780 men wage-earners in the trade and 14,810 women wage-earners.(f) Pensions were provided for certain workmen in the tobacco trade by the Financial Act of April 8, 1910. A private investigation of the tobacco trade was carried on in 1908 by Brougarel, Chantemesse and Mosny. The method of procedure was to send a questionnaire, covering in its scope all the dangerous conditions of the tobacco trade, to the medical advisers of all the

(e) In Austria-Hungary, Italy, Holland, Spain, Turkey, Portugal, Roumania, Costa Rica and Japan the trade is also a government monopoly.

(f) Jean Roseyro — *Le Monde Moderne*, 1899.

tobacco factories in France. The answers to the questionnaire were, almost without exception, favorable to the trade. This may be explained by the fact that government supervision insures adequate ventilation and fair working conditions.

In Holland the tobacco trade is a government monopoly. They have had an eleven-hour day since 1889. The working hours are generally considered too long in the cigarette factories.

In Switzerland the Federal Inspectors established in 1896 nine regulations covering the manufacture of tobacco. Among the conditions controlled by these regulations are ventilation, flooring, cleanliness and amount of tobacco in the workrooms.(g)

There have been sporadic investigations in the United States, one in Cincinnati in 1892, one in New York, and one made in 1906 by the State Board of Health in Massachusetts of cigar and cigarette factories. The report of this latter investigation says: "A fairly large proportion of the employees look pale and sickly, and in some of the largest establishments this proportion was noted as about one-tenth."

In the United States the workers are well organized for mutual betterment purposes and have made ample provision for sickness. The Cigarmakers' International Union of America is a strong organization which was founded as early as 1845, and has since then developed and grown into an organization numbering at present 50,000.

The Cigarmakers' Union has a sick benefit and a mortuary benefit. The rates of these benefits vary according to the several classes of membership. According to the figures of its president, George W. Perkins, the union includes a little less than fifty per cent of all the persons working in the trade. Since 1878 the union has paid \$3,300,169.50 in sick benefits alone and \$2,845,258.15 for death and total disability benefit. During the year 1911 the Cigarmakers' Union has paid \$201,296.03 sick benefit at a cost of \$4.132 per member and \$251,671.41 for death and total disability benefit at a cost of \$5.036 per member per year. The weekly dues of members range from thirty to fifty cents.

President Perkins gives in his annual report of September,

(g) A complete set of these regulations is given in the Appendix to this report.

1912,(h) a very optimistic statement as to the decrease in the tuberculosis rate among the members of the union. This rate was very high in the Cigarmakers' Union in comparison with the rate among the workers in other trades. According to his report, the percentage of mortality from consumption among cigarmakers has decreased as follows:

1888.....	51	per cent
1890.....	49	per cent
1895.....	35	per cent
1900.....	33	per cent
1910.....	21.5	per cent
1911.....	20.1	per cent

"This," he adds, "shows a reduction of nearly 30 per cent in the period of twenty-three years beginning with the first physical records of vital statistics in our trade, in 1688." According to the same report, in 1890, 49 per cent of the amount expended for sick benefit went to those suffering from tuberculosis; in 1910, 21.5 per cent of the total amount, and in 1911, 20.5 per cent, which shows a reduction of 20.9 per cent in ten years.

In 1890 the union paid 49 per cent of all the death benefits to the heirs of those who died from tuberculosis. In 1911 this was reduced to 20.1 per cent, a lowering of 28.9 per cent.

In view of the controversy as to the effects on women of working in the tobacco industry, it was considered advisable to make a physical examination of a number of women tobacco workers. Such an examination was made by Dr. Fanny Dembo, with the assistance of Dr. Aronovich.

Dr. Dembo has examined 600 women in cigar and cigarette factories, and her report, which is submitted herewith, is very interesting and instructive. While the number of workers examined is perhaps too small to serve as a basis for conclusions as to the effect of the tobacco trade upon women, yet the report forms a noteworthy contribution to the literature of industrial hygiene. It is significant that the results of Dr. Dembo's examination coincide with the results of similar examinations made in European countries. The physical examination was limited to tobacco factories in New York city.

IV.

PHYSICAL EXAMINATION OF SIX HUNDRED FEMALE TOBACCO WORKERS BY DR. FANNY DEMBO.(1)

The examination of over 600 tobacco workers, undertaken for the New York State Factory Investigating Commission, included the female employees of twenty-one tobacco factories in New York city. The number of employees of the establishments ranged from a small establishment of forty-three workers, thirty of whom were women, to the largest which had 1,300 workers, 1,200 of whom were women.

The total number of workers in the tobacco factories visited was 6,196, out of whom 4,921, or about 80 per cent, were women. This percentage of women in the tobacco factories is very nearly the average throughout the trade; in the paper cigarette branch the percentage is somewhat higher and in the cigar-rolling and packing establishments it is lower.

In this industry the women are rapidly crowding out the men. In view of this fact, the importance of a physical examination of women in order to ascertain the effect of tobacco work on their health is evident. There seems to have been no previous systematic examination of tobacco workers with the exception of the one conducted by Dr. Dowling, of Cincinnati, which was confined to the effect of tobacco on the eyes.

It was only with the permission and co-operation of the factory owners that the examination could be conducted, and we are glad to state that only one out of the twenty-two factories visited refused to co-operate.

Methods of Examination:

In most cases dressing rooms were used for the purpose of examination, there being first-aid rooms in only two of the factories. In many establishments, however, a secluded corner could be obtained only by screening off a part of the workroom. In each examination the employee was questioned regarding heredity, personal history, age, earnings, living conditions, social status, length of time in the trade, and home address. In the case of married women the question, "How long did you work when pregnant?" was also asked.

(1) Dr. Dembo, was assisted by Dr. Anna Aronwich.

A thorough physical examination was made of lungs and heart (bare chest and back) and of the mouth and pharynx. Whenever the appearance indicated the presence of anæmia, a hemoglobin test was made with either the Gowers apparatus or the Talquist Berringer, except in cases where the room was not sufficiently light for a hemoglobin test, or where the patient objected to the ear prick. In some of these latter cases, where anæmia seemed pronounced, a *positive* diagnosis was made without the hemoglobin test by the characteristic heart and venous murmurs. In no case was anæmia diagnosed merely from the appearance of the patient. Where there appeared to be the possibility of renal trouble the urine was examined, but in all the cases (nineteen) it proved negative.

Branches of the Industry:

We endeavored to examine workers in all the branches of the tobacco industry. The four main divisions are:

- A. Cigars.
- B. Cigarettes.
- C. Chewing and smoking tobacco.
- D. Snuff.

A. Cigarmaking is the most important and the largest branch of the industry. It requires selected material and more skill on the part of the worker.

B. Paper cigarette making is the younger sister in the industry. The manufacture of cigarettes has grown to mammoth proportions in the last decade not only in this country but in the whole of western Europe, where it was introduced a half century ago from the Orient. Just as the Havana cigar is the finest of cigar products, so the Turkish cigarette is considered the most desirable cigarette made. It is a machine-made product, however, and does not require in its manufacture the fine handcraft required in cigarmaking. Cigarmaking and cigarette-making may almost be considered independent industries, as in the one handwork is essential and in the other machinery.(j)

(j) The first cigarette machine was invented in America in the eighties.

Even the largest cigar factories have comparatively few machines, while to-day the hand-made cigarette is somewhat of an anomaly.

C. Smoking and cake tobacco establishments manufacture tobacco which is used in pipes and for chewing. Several workers employed in the only smoking and chewing tobacco factory in New York were also examined.

D. Another inconsiderable branch of the industry is snuff making. But little is manufactured in New York City.

Classification of the Workers:

The preliminary processes in the tobacco industry, such as moistening, steaming, fermentation and drying, require hard muscular exertion, and such work is done by men. Women are commonly found in the stripping, bunch-making, rolling and packing departments of the cigar trade; in the picking, shaping, tipping and packing of the cigarette trade; and in the weighing and packing in the smoking and chewing tobacco trade.

Ages:

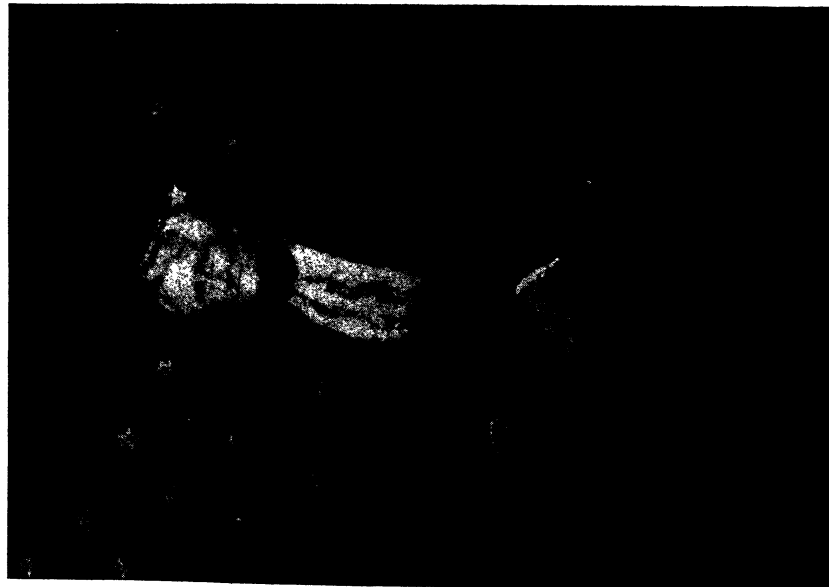
The ages of the workers examined ranged from the legal limit of fourteen to the honorable old age of sixty-six.

Certain processes, like stripping and picking, require no special skill, and open a field for the middle-aged immigrant women. We found mostly Italians and Greeks occupied in this division of the trade. Machine operating in paper cigarette manufacture seems to attract young American-born girls.

Table No. XVIII shows ages of the tobacco workers examined.

TABLE NO. XVIII.
AGES OF THE TOBACCO WORKERS EXAMINED

AGES.	NUMBER.	PER CENT.
Under 16.....	13	2.1
16-19.....	135	22.5
20-24.....	180	30.0
25-34.....	154	25.7
35-44.....	66	11.0
45 and over.....	52	8.7
Total.....	600	100.0



This woman has worked 57 years in the cigar trade.



This woman has worked 45 years in the cigar trade.



Table No. XIX shows the nativity of the tobacco workers examined.

TABLE NO. XIX.
NATIVITY OF THE TOBACCO WORKERS EXAMINED.

NATIVITY.	NUMBER.	PER CENT.
American.....	165	27.5
Native parentage.....	17	2.8
Foreign parentage.....	148	24.7
Austrian.....	22	3.7
Bohemian.....	58	9.7
English.....	5	0.8
German.....	10	1.6
Greek.....	32	5.3
Hungarian.....	19	3.2
Irish.....	7	1.2
Italian.....	166	28.0
Polish.....	7	1.2
Russian.....	90	15.0
Slovak.....	16	2.7
Turk.....	10	1.6
Others.....	3	0.5
Total.....	600	100.0

Length of Time in Industry:

The fact is that the duration of employment in this trade seems to be longer than in any other. Marriage and maternal functions seemingly constitute no bar. Many women had been working forty years and more in the trade, without interruption. Others had stopped industrial life for a long period, during which they had brought up a family, and returned to the factory later in life. One woman of sixty-six showed a record of fifty-seven uninterrupted years of work.

TABLE NO. XX.
NUMBER OF YEARS IN TRADE OF THE TOBACCO WORKERS EXAMINED.

YEARS IN TRADE.	NUMBER.	PER CENT.
Under 1.....	79	13.2
1-5.....	204	34.0
6-10.....	169	28.2
11-20.....	113	18.8
21 and over.....	34	5.7
Unknown.....	1	0.1
Total.....	600	100.0

Diseases:

Before looking over the table of diseases, let it be stated that the general opinion held formerly, that the tobacco trade is a

dangerous one, has changed to a more favorable view in recent years. The horrors of the tobacco trade, as described by Ramazzini in the eighteenth century, have practically disappeared with the introduction of modern processes and machinery. The medical attitude toward the trade has changed to such a degree that many physicians, instead of condemning this industry, regard it as one prophylactic to certain infectious diseases. However, this optimistic view is not unanimous among physicians, and there are many conflicting opinions.

In the latter part of the last century, Kostial takes the view that tobacco is a dangerous trade for women, leading especially to irregularities of menstruation, menorrhagia, abortions and to the bearing of weak offspring. This latter accounts in great measure for the high rate of infant mortality among the children of tobacco workers. These theories are considered merely theories by Sir Thomas Oliver and other distinguished authorities who do not regard tobacco work as unhealthful for women.

The fact is that many evils ascribed to the tobacco trade, as such, result from the factory conditions and the social status of the workers. For instance, the high percentage of tuberculosis among cigarmakers may be accounted for first, by the methods of work, sitting in a stooping position at narrow tables opposite each other and in crowded rooms; secondly, by the wretched condition of shops in general; and thirdly, by the home work done in insanitary tenements. Educational work of recent years, accompanied by improved working conditions in many shops, has unquestionably brought good results.

Another old-time prejudice against the tobacco industry was that nicotine had the same effect on those who worked with tobacco leaves as it had upon smokers. This theory is fallacious. During fermentation, when the product is not being handled, the greatest amount of nicotine is given off. During other processes, there is but slight emanation of nicotine. There is no comparison of the amount of nicotine inhaled in smoking with that given off in the processes of tobacco manufacture. The investigation undertaken by Dr. Dowling, of Cincinnati, in order to establish the frequency of amblyopia among tobacco workers confirms this statement. The only two cases of amblyopia

among women mentioned throughout the whole German literature on the subject indicate an idiosyncrasy on the part of the two subjects. As it is known to be of frequent occurrence among the men workers who are often inveterate cigar smokers, it would seem to be the result of smoking.

Another erroneous conception is that the tobacco trade is a dust-creating one. The fact is that most of the processes require a certain moisture of the tobacco, which reduces the dust element to a minimum. In the few processes where dust is created, the evil can be easily remedied by proper exhausts.

According to our table, pharyngitis was quite common.

On account of certain restrictions mentioned before in the examination, our percentage of anaemia is rather too low, as many suspected cases were not included on account of the impossibility to make blood tests.

Table No. XXI shows the diseases affecting the tobacco workers examined.

TABLE NO. XXI.
DISEASES OF TOBACCO WORKERS EXAMINED.

	NUMBER.	PER CENT.
Total number examined.....	600	100.0
Number of persons having no disease.....	172	28.7
Number of persons having one or more diseases.....	428	71.3
<i>General Diseases:</i> Total.....	112	18.6
Phthisis.....	8	1.3
Rheumatism.....	30	5.0
Anaemia.....	74	12.3
<i>Nervous System and Organs of Special Sense:</i> Total.....	171	28.6
Ear.....	7	1.2
Eye.....	72	12.0
Nose.....	70	11.7
Nerves.....	22	3.7
<i>Circulatory:</i> Total.....	27	4.5
Heart.....	25	4.2
Varicose veins.....	2	0.3
<i>Respiratory:</i> Total.....	34	5.7
Bronchitis, acute.....	6	1.0
Bronchitis, chronic.....	15	2.5
Larynx.....	12	2.0
Pleurisy.....	1	0.2
	157	26.2
Pharynx.....	153	25.5
Tonsillitis.....	4	0.7
<i>Digestive Organs:</i> Total.....	104	17.3
<i>Pelvic:</i> (irregularities of menstruation).....	142	23.7
<i>Skin:</i> Total.....	5	0.8
Contagious.....	1	0.1
Non-contagious.....	4	0.7
<i>Locomotion:</i> Total.....	52	8.7
Bones.....	2	0.3
Joints (spinal curvature).....	50	8.4
Total number of cases.....	804	.....

Pharyngitis: Pharyngitis claimed the highest percentage. It is characteristic that a good many of the subjects of this disease seemed hardly aware of their own symptoms. Most of the cases of pharyngitis were found among the cigarmakers.

Indigestion and Constipation: These were frequent complaints. This may be considered as much a natural result of the indoor sedentary life as of tobacco work.

Irregularities of Menstruation: Much has been written about the emmenagogic influence of tobacco. This seems to have been partly confirmed by our investigation, the number of irregularities and menorrhagia being quite considerable.

Abortions and Infant Mortality: As to the number of abortions and high rate of infant mortality among tobacco workers, this is a question to be decided only after a comparative study in different trades employing child-bearing women. The high rate of infant mortality may be due at least as much to work of the women in the factory during pregnancy and to the early return of the mother to work (which necessitates artificial feeding and neglect of the infant) as to the effect of tobacco. That women in the tobacco industry work in advanced stages of pregnancy is shown by the following table. The percentage certainly used to be much higher when cigarmaking was a home industry:

Table No. XXII shows conjugal condition of the tobacco workers examined.

TABLE NO. XXII.
CONJUGAL CONDITION OF THE TOBACCO WORKERS EXAMINED.

CONJUGAL CONDITION.	NUMBER.	PER CENT.
Single.....	362	60.3
Married.....	181	30.2
Widow.....	57	9.5
Total.....	600	100.0

EMPLOYMENT IN FACTORY DURING PERIOD OF GESTATION.

TIME WORKED DURING PREGNANCY.	NUMBER.	PER CENT.
Till the fifth month.....	18	7.5
Till the eighth month.....	34	14.3
Till the end.....	39	16.4
Did not work in factory.....	147	61.8
Total.....	238	100.0

Tuberculosis: The low rate of tuberculosis, though apparently at variance with current opinion and with the evidence of some early German investigators, seems to be in accord with recent statistics of German state benefit societies.(k) These statistics

(k.) Quoted from Zigaretten Ind., by Kurt Borman. *Soziale Praxis*, 1910.

furnish the following data for tuberculosis among tobacco workers:

“From 1903 to 1906, per cent of tuberculosis among tobacco workers:

Male	2.5
Female	1.0”

The difference in the rate for the sexes may be laid to sources outside of the trade, alcohol possibly being largely accountable for the high rate among men. Another condition which may account for the higher rate of tuberculosis in Germany than in this country is the fact that the tobacco trade is considered a poorly paying one in Germany,(1) whereas it is one of the best paid trades for women in the United States.

Nervous Ailments: No special affection of the nervous system may be mentioned, unless headaches are diagnosed as such.

Skin Diseases: The number of skin diseases is also rather small. However, several cases of dermatitis found in one cigarette factory could be directly traced to the effect of the tobacco dust.

Spinal Curvature: The number of spinal curvatures is certainly due not only to the sedentary occupation but also to the common use of backless chairs.

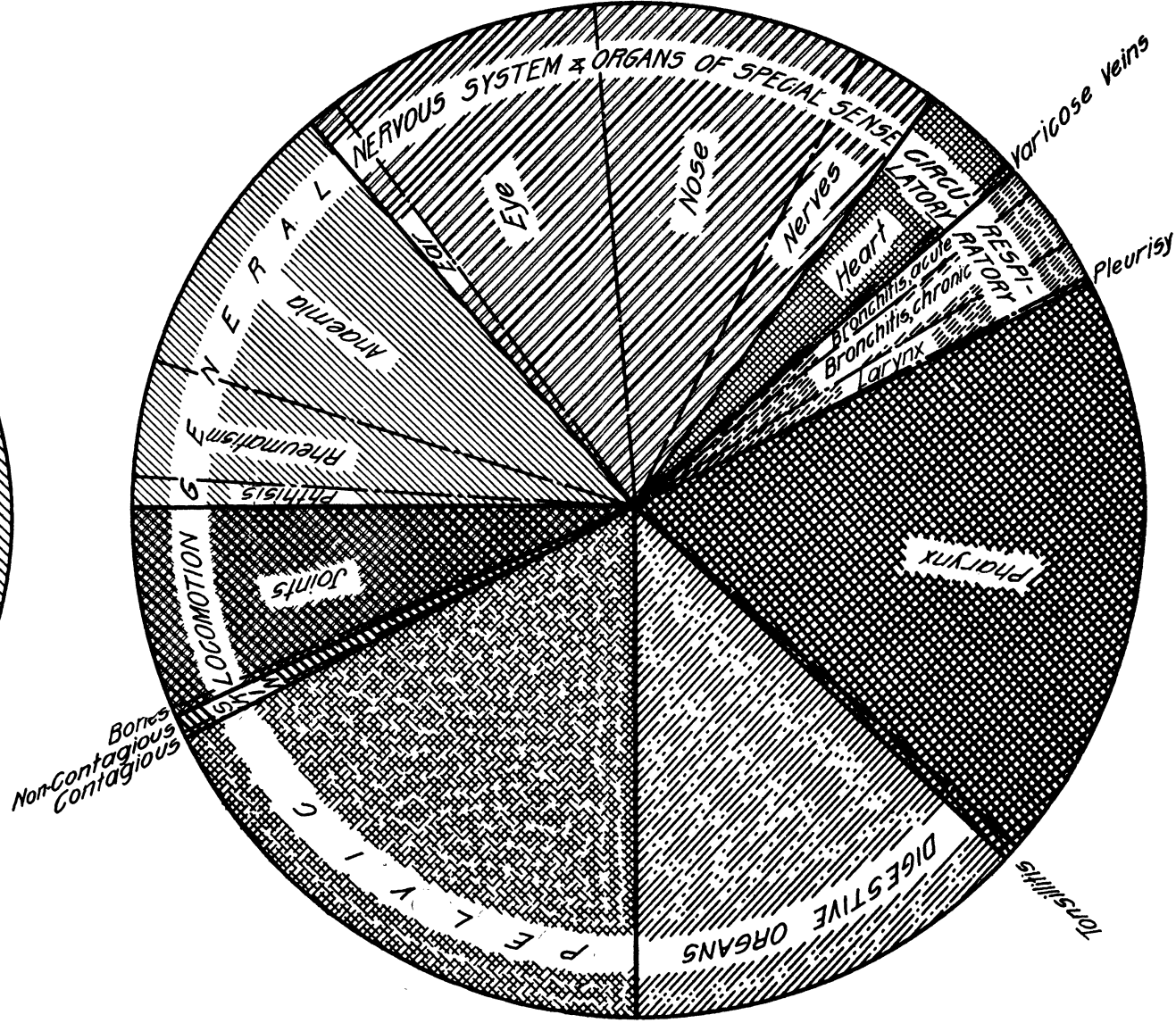
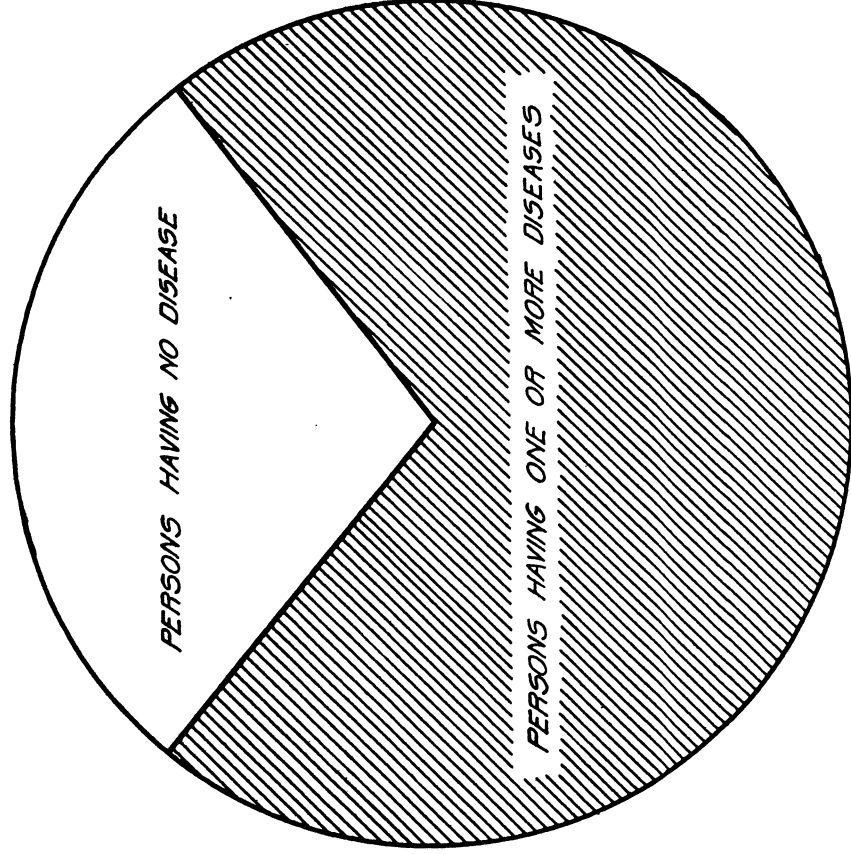
Condition of Teeth: Bad teeth were common to many of the tobacco workers examined. The insanitary habit of biting the bunch and licking the outer cover of the cigars (a practice prohibited in Germany since 1907) may be accountable for the gray deposit on the teeth and the inflammation of the gums. The bad teeth, however, among a large number of the strippers who had recently joined the trade (and whose mouths did not come in contact with the tobacco) would indicate that this condition is due rather to the lack of mouth sanitation than to the tobacco.

SANITARY CONDITIONS IN THE SHOPS.

The privilege of examining workers on the premises has been of great value to the examiner, as it afforded opportunities to

(1) Shellenberg: *Tobacarbeiter Eulenberg Encyc. B. '8.*

DISEASES OF TOBACCO WORKERS



study the different processes of manufacture. This is necessary in order to draw opinions of any value as to the effect of the work on the health. Besides the twenty-one shops in which the 600 workers were individually examined, twenty more tobacco factories were visited so as to be able to judge better the sanitary conditions prevailing in the industry.

Cigarette Factories:

There is marked difference in the sanitation of cigar and cigarette factories, the latter being, as already mentioned, a comparatively new branch in the tobacco industry and concentrated in the American Tobacco Company and a few large individual firms. The sanitary conditions of the cigarette factories are, on the whole, better than those in the cigar trade. Scrupulous cleanliness prevails in several establishments visited and but little tobacco odor is noticeable in the packing departments. As has been stated before, pharyngitis and anaemia were more commonly found in cigar than in cigarette factories. This is very likely due to the improved sanitary conditions existing in most cigarette establishments, as well as to the fact that the tobacco is not handled to any great extent by the workers. On the other hand, the process of "picking" in the cigarette industry seems to be a dust-creating one. As such it must be considered a more injurious process than the "stripping" in the cigar industry. This fact is well illustrated by the following cases:

The packing room of one of the most modern factories visited presented a scrupulously clean and well-lighted workplace, with ample space for each worker and hardly any noticeable odor of tobacco. The girls were mostly American-born but of foreign parentage. They made a clean, neat appearance and had few ailments. The picture presented, however, in the picking room was altogether different. Here there was a heavy odor of tobacco, coming from the huge cases of tobacco which occupied a large part of the room. In one badly lighted corner of the room girls were perched on high backless stools around cases pulling out leaves, which process stirred up considerable dust. This form of "picking" was quite unique in the examiner's experience, as the picking arrangements heretofore observed had been quite dif-

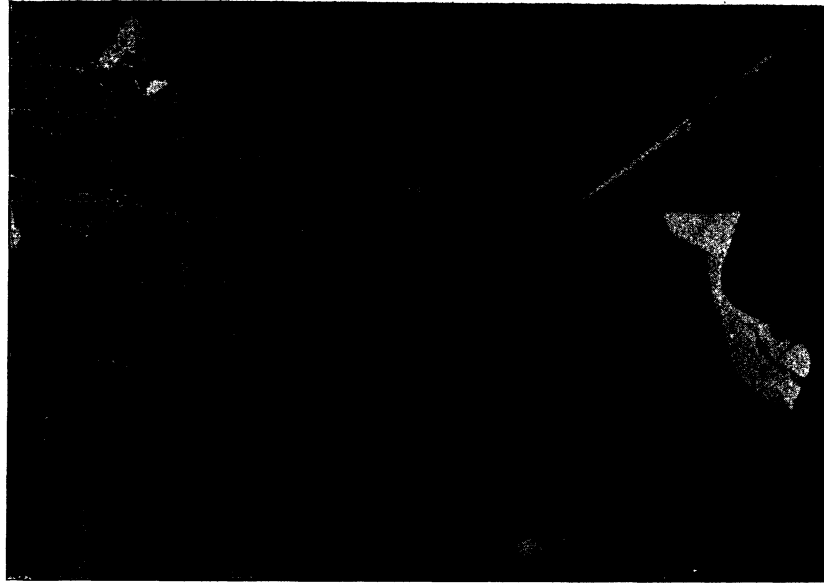
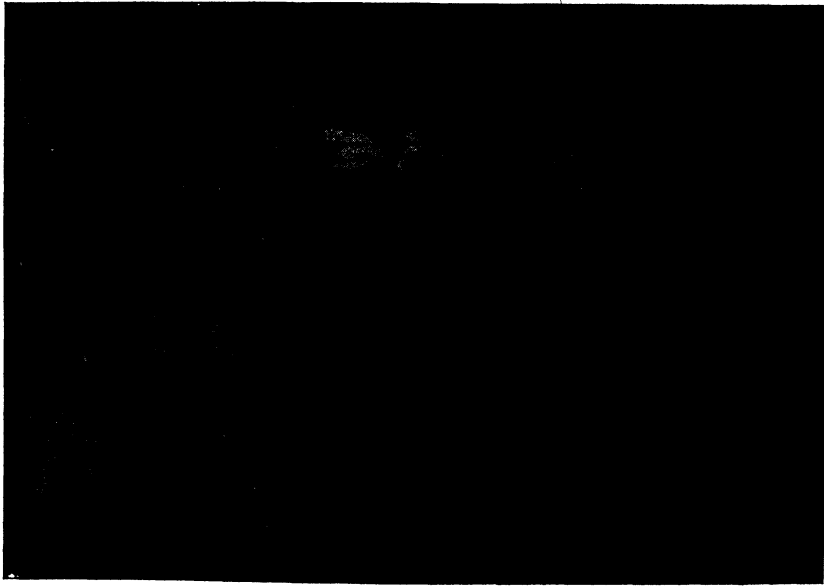
ferent. There were usually long trough-like tables, on both sides of which the pickers were sitting on benches or seats of the usual height. The picked leaves were carried off by the conveyers to the cutting machines. This form of work produces much less dust than that in the room described, in which the examination of the twenty-six girls revealed two cases of erythema on the chest and face. Several others reported having had similar eruptions before. Six had nasal catarrh, six conjunctivitis, six anaemia, and six complained of profuse menstruation. This latter symptom is to be taken especial notice of as coinciding with the evidence of some German physicians, who attribute this condition to the effect of tobacco dust.

The number of cigarette pickers is rather too small for serious deductions, but there is no doubt in the examiner's mind that this process of work is unhealthy and could be remedied by modifications in the working posture and by the introduction of some dust-exhausting appliances.

Another faulty condition was noted in the machine room of one of the cigarette factories. Besides the regular work in this room, which was crowded with machines, box pasting was being carried on which caused a sickening odor of hot paste. Many of the girls in this room complained of headache and nausea owing to the unpleasant fumes of paste, which was more perceptible and disagreeable than the odor of the tobacco.

Cigar Factories:

Turning from the paper cigarettes to the cigar factories, the general impression is that the insanitary conditions of the latter are on the whole more pronounced. This may be accounted for by the numerous cigar manufacturers who do work on a small scale. Small employers can often hold out against the trusts at the expense of sanitary conditions. This statement does not mean that the trusts alone have sanitary plants or that all small employers offer the worst conditions, as the reverse was true in several cases. The best sanitary establishment among those examined belonged to a private firm, whereas the standard of sanitation in one of the largest trust establishments employing 1,200 women was very low.



CIGAR SHOP IN CELLAR OF TENEMENT, MULBERRY STREET, NEW YORK CITY.

Shows finished cigars piled in bundles and boxes at boy's side.— Baby carriage, stove and cooking, dirt and refuse in the room beside stock.



The housing of the different factories varied from a few new modern plants with large, light, well-ventilated workrooms to old loft buildings with rickety stairs, poor light, low-beamed ceilings hung with cobwebs, walls often unfinished and dirty, and floors covered with thick layers of mud. The working tables in these latter places were usually filthy. Several small cigar factories were found in cellars. The dressing rooms often presented semi-dark, slightly partitioned-off filthy corners, with no accommodation except a few hooks.

What may be described as a parody of a first-aid room was noted in one of the establishments: in one corner of a large, light but exceedingly filthy room there stood a bedstead with a bare, dust-laden mattress. The washing facilities consisted of a dirty table, with a dirty basin and still dirtier pitcher. More than half of this room was occupied with cases of tobacco, and it was found upon inquiry that this "first-aid" room was being used as a "sample room" for assorting tobacco.

The water closets were in several cases found to be offensively near the work tables, and the sinks damp and filthy. These sanitary conditions were observed incidentally while passing through the factory.

Nicotine in Dust:

The examination undertaken by Dr. Heuke(m) reveals 0.7 per cent of nicotine in the dust taken for examination from tobacco factories. If dust be allowed to accumulate the atmosphere becomes permeated with nicotine, and is therefore doubly harmful to the workers. Dirt in tobacco factories is insanitary not only on general principles but because it contains special poison.

Again, the largest amount of nicotine is given off by the tobacco during fermentation and drying, which goes on while tobacco lies in stock. In several European countries it is not only prohibited to work near the stock room, but only a certain amount of tobacco is allowed to be kept in the workrooms not exceeding the amount necessary for the production of the day. In our investigation we observed in various places a large number of huge cases of tobacco in the rolling and bunching departments,

(m) *Soziale Praxis*, 12 Jahrgang, No. 30.

for strippers to work in rooms adjoining the stock rooms with practically no partitions between. In one place, employing about fifty workers altogether, more than half of the floor space near the exit was occupied with boxes in such quantities as to be gravely dangerous in case of fire.

Seats:

Another grave offense to the health observed throughout the industry was the kind of seats provided for the workers. Thousands of women were found seated on boxes, benches, stools and all sorts of makeshifts. All these seats were devoid of backs and in many cases broken and unstable. In a few exceptional cases chairs with spike-like backs were found, but never in sufficient number for all employees. To our question as to whether there was any special reason why the seats should not be provided with backs, several foremen explained that the backs would not be used anyway, as the worker must lean over the tables or stripping boxes. Evidently the fact that a few seconds' relaxation could and would probably be enjoyed if the workers had something to lean back upon was never thought of.

The large number of spinal curvatures found among those spending the greater part of their lives in the workshop should constitute a sufficiently strong plea for the introduction of hygienic seats for all sedentary occupations. Moreover, the increasing number of children who go directly from school to the factory should certainly be granted this protection to their still immature bones.

Minors in the Trade:

In several European countries there has been for some time regular medical supervision. The reports of the English factory inspectors bear evidence to its value. In England the custom is to examine every minor for physical fitness upon his application for work. The applicant is often temporarily rejected until ailments easily curable, like adenoids, defective eyesight, etc., have been cured.

Children who have recently left school, where they were under strict hygienic regulations, enter at the age of fourteen upon the

hardships of factory life, where all such regulations are conspicuously absent. Even the small number of minors observed during our investigation gave sufficient proof by their appearance and working conditions of the necessity of medical supervision in this industry. The following specific cases will sufficiently illustrate the conditions:

Case No. 251. Caroline K——, a poucher, fifteen years old. Examination revealed heart disease (as a sequel to scarlet fever). She started her industrial life as a cash girl in a department store, where she had to run up and down stairs. Her mother, finding the occupation too strenuous for her, tried to find her an easier job and placed her in a cigar factory. The room in which the child works is quite sanitary, having plenty of space and air. The work itself is easy enough, as it consists merely in putting cigarettes into pouches. She sits at her work. Now, even taking for granted that the handling of cigarettes is not injurious for a healthy girl, it may have a bad effect on a child with heart disease. Besides, there is another most important circumstance which in itself ought to constitute a prohibition for Caroline to work at this factory, viz., she works on the *seventh* floor and there is no elevator in the establishment. Going out for lunch means to her an extra trip of six flights, in addition to the trip in the morning, and climbing six flights twice a day is not to be recommended to any one with heart disease.

Case No. 253. Mary G——, a poucher, is fifteen years old. Looks pale, has a rapid pulse and a temperature of 99.8. Her lungs are normal, but the bandage on her neck covers a few scars which tell a story of several old abscesses, and one which discharging pus at the time of the examination explains the pallor, pulse and temperature. She is even now under the physician's treatment, she says, but comes to work daily.

Welfare Institutions:

We found that a non-compulsory sick benefit society has been instituted in one of the better class of factories which came under our observation. The dues are ten cents weekly, and this amount insures to the employees of this establishment medical advice and sick benefit. The firm also contributes to the fund.

When this sick benefit society was first started a physician called daily at the factory, where the employees could consult him in a special office. Unfortunately, this arrangement, which would seem highly commendable, has been changed, and at present the members of the sick benefit society only have the privilege of calling on the doctor at his regular office hours.

In one of the cigarette factories we found a really clean and practical first-aid room, provided with a woman attendant.

In most trades it is advisable to provide separate lunch rooms. In the tobacco trade it is most important to have them. A thorough ventilation is required at least once a day to clear the room of the unavoidable tobacco odor and the impure air created by so many workers being crowded together. In Europe tobacco workers are forbidden to remain in the work room during lunch hour.

Throughout our investigation we found but one lunch room. Unfortunately this lunch room together with the lockers for clothes was located on the seventh floor, which circumstance greatly reduced its value. Many of the girls complained of mounting the stairs three times daily. In two or three factories separate tables were put in a spacious part of the work room during lunch hour. In one cigarette factory tea and coffee were served, free of charge, to the workers in the packing room. In all the rest of the factories the employees had their lunch while seated at their work tables.

Model Cigar Factories:

In our investigation we found no one factory which could justifiably be called a model one. It appears that we have to go outside of the United States to find such a factory. According to the description given by Dr. Kurt Borman of a model cigarette factory in Dresden, the employees there have at their disposal not only elevators, lunch rooms and a roof garden, but also a library, bath and rest room with reclining chairs.

The following quotation from a paper read by Dr. Dowling of Cincinnati before the American Medical Association in 1909 gives the description of a French tobacco factory:

"A large tobacco factory situated at Issy, near Paris, employed 1,200 persons, out of which 800 were women. The structure is

an immense one. It is built of stone and brick. It is up to date in its appointments, has the latest modern machinery and turns out only cigars, cigarettes and tobacco for pipes. All the floors contain cuspidors with a disinfectant substance and the rooms are kept scrupulously clean. All the tobacco dust from the machines is conducted through pipes to a flue and escape through a chimney in the roof, and very little dust is to be found in the work room, and there is comparatively little smell of tobacco. There are twelve large rooms in the establishment, each forty meters long and forty meters high. Besides these there are small work rooms. The men are employed largely to do the heavy work, while most of the skilled work in turning out cigars and cigarettes is done by the women. The superintendent informed me that the women are more dexterous in the use of their fingers than the men and hence are given this kind of work. Most of the employees go home for dinner at noon; for those who remain there is a pantry and kitchen for warming their food. There is a library in the establishment and baths, and there is an emergency hospital for those who may be injured and a dispensary with a full supply of drugs for the factory doctor who visits the establishment daily. All the water for drinking purposes is sterilized by machinery. There is a good sized nursery for the babies that the working women may bring with them, with a kitchen for preparing foods, bath tubs and closets for toilet, etc.

“The women do not present an anaemic appearance which we notice among those employed in our American tobacco factories. The medical director, who resides in Paris, is at the head of the medical department of these tobacco factories as well as the other factories of the state. There are local physicians attached to the various factories whose duties are to look after the hygienic conditions of the institution as well as to care for any of the employees who may be injured while on duty. As will be seen, there are no minors employed in these French tobacco factories. This is as it should be. They should also be excluded from tobacco factories in America, and for this purpose we should have a government supervision of our tobacco factories so as to have uniform laws enacted forbidding their employment.”

CONCLUSIONS.

1. The tobacco industry, *if carried on under proper sanitary conditions*, cannot be classified among the dangerous trades for the average healthy person. However, some of the ailments directly traceable to the effect of tobacco, like anaemia, pharyngitis and bronchitis, may constitute gateways to graver conditions. Therefore, individuals predisposed to those diseases and those of tuberculous diathesis should be advised against selecting this trade.

2. Medical supervision of factories is recommended. This means the examination of applicants to the trade and the regular hygienic supervision of the factories.

3. Minors ought not to be admitted to certain branches of the trade such as picking in the cigarette industry or stripping in the cigar factories.

4. Besides general hygienic regulations for factories, the provision of separate lunch rooms and the prohibition of the workers remaining in the work room during lunch hour are of the first importance.

5. The eight-hour work day, already introduced in a large part of the trade, owing to the efforts of the Cigarmakers' Union, should be legally applied to the whole industry.

6. The workers in the trade should be educated to the necessity of all the above mentioned sanitary provisions so as to secure their co-operation in the introduction and maintenance of the same.

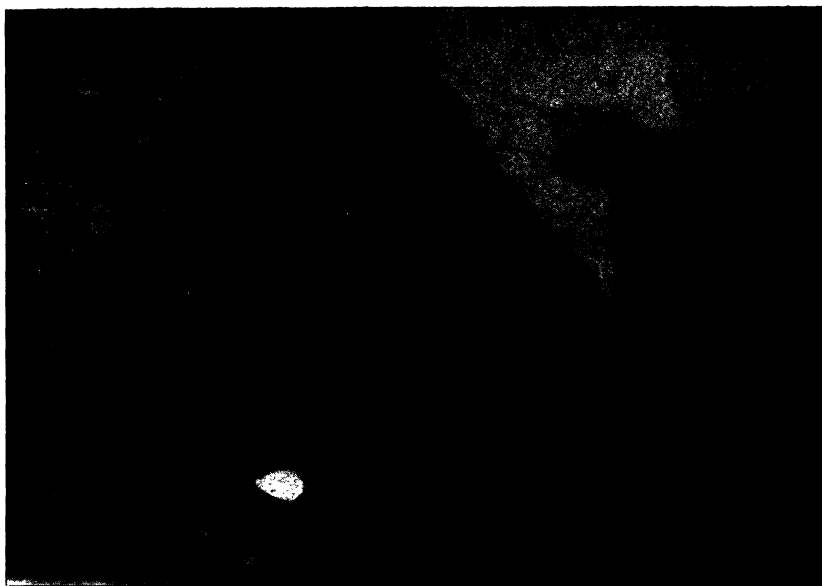
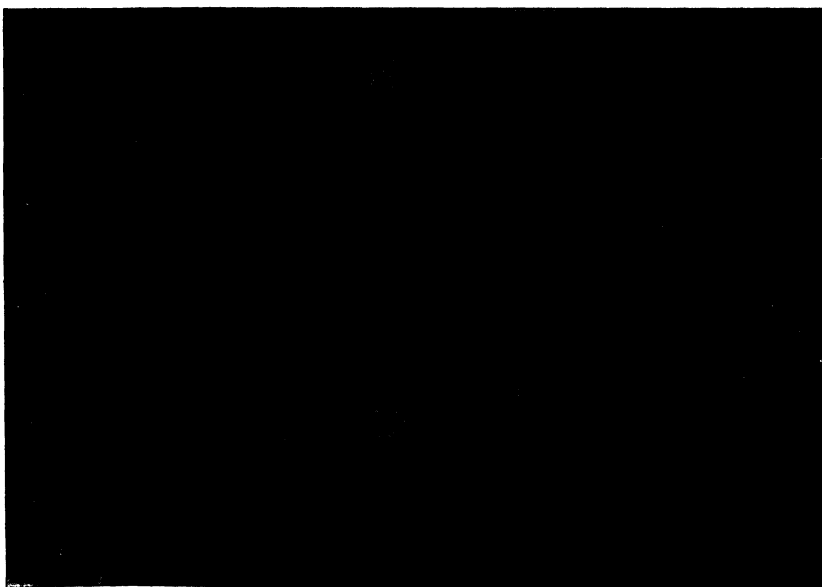
APPENDIX TO CHAPTER V.

ARTICLE 4. FEDERAL ORDERS OF AUGUST 10, 1896, FOR THE
REGULATION OF TOBACCO AND CIGAR FACTORIES IN SWIT-
ZERLAND.*

1. Each workroom should contain a minimum air space of 10 m. per operative.

2. The workroom shall be used for no other purpose than cigar or tobacco making. Adjoining rooms that are used as living rooms or storerooms must be closed off entirely from the shops during the hours of work.

* La Protection Legal du Travail en Suisse, Jean Sigg, p. 140.



CIGAR SHOP IN CELLAR OF TENEMENT, MULBERRY STREET, NEW YORK CITY.

Four men were at work making one-cent "stogies." From 925 to 1,200 can be made in one day by one man.—Filthy room.



3. There must be sufficient window spaces to distribute the necessary amount of light to all the workers. The windows should be so constructed as to open completely and provided with curtains. Windows of modern construction should not be less than 1.8 m. in height. (See the regulations of the Federal Council drawn up December 13, 1897, controlling the construction and reconstruction of industrial establishments.) In work places that it is impossible to ventilate adequately by reason of defective construction, artificial ventilation should be installed.

4. The floors of the workshop should be made as nearly solid as possible, presenting the minimum of joints. However, when the floors are of stone or cement, boards or mats shall be provided at all work places.

5. Twice a day the workroom shall be thoroughly ventilated by opening all outside doors and windows. Occupation of the workroom during sleeping hours is forbidden. The floors and work tables shall be washed or cleaned daily. The ceiling and side walls must be washed or painted once a year.

6. Only sufficient tobacco for the day's production shall be kept in the workshop. It is forbidden to dry tobacco in the workshop at any time.

7. Wraps, hats, street clothing, etc., of the workers must be kept in closed lockers or in a separate room.

8. Washing facilities with soap and towel shall be provided for the use of the workers in each establishment.

CHAPTER VI

THE PRINTING INDUSTRY.

I.

The Sanitary Conditions of the Printing Shops:

In consideration of the general magnitude of the printing industry, which affects over 258,434 employees in the United States and over 63,120 in New York State, progressive industrial conditions within this trade are of the first importance.

Since printing became a large industry it has been regarded as a dangerous one and the sanitary conditions of the printing shops have always been regarded as unfavorable. The growth of the business has so engrossed its owners and promoters that proper protection of the health conditions and the interests of the workers has been largely neglected by them in this country and abroad.

The increase in the printing business for the period from 1899 to 1909 in the United States was 86.7 per cent, the value of the products having increased from \$395,186,629 in 1899 to \$737,876,087 in 1909.

The growth in New York State has been on a proportionately large scale. New York is responsible for nearly one-third of the typographic work in this country in addition to producing fully one-half of all the lithographing and engraving done.

Processes:

It is unnecessary here to enter into a detailed description of the various processes employed in the printing industry. The actual work of printing consists of three essential operations: First, composing the type; second, the preparation of the body of composed type for the press; and, third, the taking of the impressions from this form or body of type.

The composition is done by hand or by machine. The composed type is then placed on a smooth stone or iron surface and "locked" inside of a steel frame. This "form," as it is called, is then placed in the press. The presses used are of two general types,

viz., the job press and the cylinder press. The cylinder press is always power-driven.

There has been within the last two decades great progress in the invention and utilization of machinery for the two chief printing processes — composition and press work. In newspaper work instead of a form of type being used for press work papier maché moulds are made from the composed page of type and a molten stereotyped metal page is made thereof and is used in the press. This is called *stereotyping*.

An *electrotype* is made by taking a wax mould of the page of composed type or engraved plate, coating it with graphite to make it a conductor of electricity, and then suspending it in a solution of copper sulphate. A current of electricity is sent through the solution and a thin shell of copper is then formed. This is backed up with molten lead to the required thickness.

Hand composition consists of picking up the lead type from its place in the case and placing it in a line in the “stick.” After the type is used the compositor also distributes it by placing each individual type in its proper box in the case. Within the last decade hand composition has been largely superseded, especially in the United States, by the *linotype* or *Mergenthaler* printing machine which is in general use. This machine casts a solid line of type at a time. The lines of type are called “slugs.” The letters selected by the operator are cast in solid brass in the length of line required. Instead of types, brass matrices are dislodged by the operator pressing upon a keyboard. These matrices are automatically arranged over the mould that forms the line. When the line is full another automatic device adjusts wedges between the words and spaces off the line. At the same instant a jet of fluid metal, consisting largely of lead, which is kept in a heated pot in the machine, is injected and drawn out of the mould as soon as it cools sufficiently. The brass matrices are automatically returned to the proper receptacles.

There are several other makes of typesetting machines, the most important of which, from a hygienic standpoint, is the *Linston* or *monotype* machine, in which the two operations, that of working a keyboard and that of casting the type, are entirely separate. By the operation of a keyboard a strip of paper is perforated with

holes. This strip of paper is then fed into another machine in which the type is cast and set. This other machine need not be in the same place or even in the same room with the first one.

There are two other processes in the printing industry which are closely connected with it, namely, *lithographing* and *photo-engraving*. In the first one the design is drawn upon a stone in ink; the stone is wet to prevent the ink from sticking to the rest of the surface; and the paper is laid on the stone and then run through the press, which gives the impression to the paper. In the second one photo-engraving, halftone plates are prepared from a photograph. This is done by photographing a picture on a metal plate and then treating the latter with acid to eat away the surfaces which are to be left white in the finished picture.

Our Investigation:

During 1911 and 1912 our inspectors visited 348 separate printing places, in which there were found working 9,047 persons, 14.7 per cent of whom were women and 0.8 per cent minors under sixteen.

The printing establishments inspected were distributed in a number of cities, although the majority of those inspected were in New York City.

The sanitary conditions of the printing establishments have been found to be deplorable in a majority of cases. The main sanitary defects which were observed by the inspectors were improper location, inadequate and improper light and illumination, lack of ventilating devices, excessively high temperatures, inadequate provision for washing, dressing and lunch rooms, and general neglect of cleanliness.

The largest number (57.5 per cent) of the printing establishments inspected were located in loft buildings. A very large percentage (33 per cent) were located in converted tenement or dwelling houses, and only thirty-three (9.5 per cent) were in buildings especially constructed for printing and publishing. The establishments which were found in converted tenements and in some of the older loft buildings were in very bad condition. The converted tenements were old buildings with overcrowded rooms filled with men and machinery. The fire dangers in these establish-

ments were very great on account of the quantities scattered around the rooms and stored in them. Two of the printing establishments were found located in cellars. A large amount of press work is also done in cellars and basements.

The inspectors found inadequate daylight in 48.4 per cent of the shops investigated. This statistical statement does not illustrate the conditions inasmuch as artificial light is almost always used in printing shops — such lights unduly raising the temperature, consuming the available oxygen and adding to the impurities of the air. The glass panes of the windows and the surfaces of walls and ceilings were almost invariably thickly coated with dust, interfering with the light and necessitating artificial illumination during the day.

Special safety devices for machines were found in but a very few of the shops, the moving parts of the machinery and gearing being as a rule unprotected.

There is a total lack of adequate provision for ventilating printing establishments. The abundant dust from the type, the fumes from the molten lead, the particles of graphite from the stereotyping processes, the heat from the artificial illumination and from the gas-heated lead pots in the linotype — all these cause extreme vitiation of the air in such establishments. Mechanical ventilation was found in but thirty-two (6.1 per cent) of the shops. There were special devices for ventilation in but 14 per cent of the shops, and in most cases those provided were inadequate.

Separate dressing rooms are apparently an unknown luxury in printing establishments. They are found in but a very few of the shops. Separate lunch rooms are also rare. Only four establishments out of 348 boasted of this modern feature.

It is impossible to properly cleanse the hands from the lead types, etc., in a printing shop without the use of hot water, soap and towels. Washing facilities were found to be "adequate" in 83.3 per cent of the shops, but as the inspectors did not find many shops making provision for hot water, the washing facilities would better be classed as inadequate. Without adequate provision for washing the hands and without separate lunch rooms the workers are compelled to eat their food with lead-grimed and dusty hands in the shop or other place of work.

The general cleanliness of the establishments left much to be desired. The inspectors considered cleanliness "poor" in 64.7 per cent of the shops. The location and conditions of the toilet accommodations was generally condemned by the inspectors. In 54.4 per cent of the toilet compartments the light was poor and in 53.7 per cent the ventilation was poor, while in 0.8 per cent it was very bad.

Compared with past conditions within the memory of most printers, the sanitary conditions of the present-day printing shops show great improvement. This is especially the case in the larger establishments which have proper supervision. The majority of the small shops are still in a very bad condition.

A great many shops may still be described in the apt words of Mr. Donnelly, who said before the Federal Industrial Commission of 1899, "There are printing offices in New York that would have to be cleaned with a hoe."*

*Industrial Commission Reports, Vol. 7, p. 176.

TABLE NO. XXIII.
PRINTING, 1911-1912.

Number of establishments.....	848
Number of shops.....	523

	NUMBER.	PER CENT.
<i>Type of Building:</i>		
Special factory.....	33	9.5
Loft.....	200	57.5
Converted tenement or dwelling.....	115	33.0
Not specified.....		
Total.....	348	100.0
<i>Wage Earners:</i>		
Men.....	7,640	84.5
Women.....	1,334	14.7
Minors under sixteen.....	73	0.8
Total.....	9,047	100.0
<i>Light and Ventilation:</i>		
Inadequate light in shop.....	253	48.4
Shops using mechanical ventilation.....	32	6.1
Shops using special devices.....	73	14.0
<i>Cleanliness of Shop:</i>		
Good.....	154	29.4
Poor.....	338	64.7
Bad.....	31	5.9
No report.....		
Total.....	523	100.0
<i>Toilets, Location:</i>		
Yard.....	12	2.3
Hall.....	111	21.2
Shop.....	385	73.6
Elsewhere.....	9	1.7
No toilet.....	5	1.0
No report.....	1	0.2
Total.....	523	100.0
<i>Light:</i>		
Good.....	183	35.0
Poor.....	284	54.3
Bad.....	43	8.2
No toilet.....	5	1.0
No report.....	8	1.5
Total.....	523	100.0
<i>Ventilation:</i>		
Good.....	183	35.0
Poor.....	281	53.7
Bad.....	46	8.8
No toilet.....	5	1.0
No report.....	8	1.5
Total.....	523	100.0
<i>Cleanliness:</i>		
Good.....	167	31.9
Poor.....	307	58.7
Bad.....	36	6.9
No toilet.....	5	1.0
No report.....	8	1.5
Total.....	523	100.0
<i>Establishments Having Special Conveniences:</i>		
Adequate washing facilities.....	290	83.3
Separate lunch rooms.....	4	1.2
Separate dressing rooms.....	8	14.5

The percentage for dressing rooms is taken of the total number (151) investigated in 1912.

II.

HEALTH OF THE WORKERS.

Investigations:

In no other trade are the dangers so generally recognized and classified as such by unanimity of opinion among scientists and investigators as those in the printing industry; nor is there a trade where the statistical proof and the mortality and morbidity data are so voluminous and convincing as those relating to the injurious effects of this occupation on the persons employed therein.

For two centuries numerous investigations of the dangers in the printing trade have been made in various countries. From the days of Ramazzini to the present time the reports of the frequent inquiries instituted to discover the relation of the dangers in the trade to the health and mortality of the workers have all characterized printing as an exceedingly unhealthy occupation.

As early as 1835, *J. B. A. Chevallier* published the results of a private investigation of the printing trade in France, showing the severe disorders suffered by printers. This French investigation was conducted among the employers as well as the employed, and a study was made at the same time of mortality and morbidity among printers.

Hirt, the founder of modern industrial hygiene, unhesitatingly called printing one of the most dangerous of all the trades; and *Stumpf* in 1895 came to the conclusion that "Tuberculosis is the most frequent cause of mortality among printers and type-founders."

In England there were investigations of the printing trade as early as 1843. In 1863, under the direction of Sir John Simon, medical officer of the Privy Council, *Dr. Edward Smith* conducted an investigation of London printing houses. He found deplorable conditions caused by overcrowding, gas combustions, night work, and general absence of sanitation. Investigations have also been made in recent years by the *Women's Industrial Council*, the *Royal Statistical Society* and *Hutchinson Trustees*.

In 1861 the French government appointed a commission to inquire into the prevalence of lead poisoning among printers and to draw new statutes to regulate the trade.

In 1905 the International Association for Factory Legislation offered a prize for the best presentation of the facts of the printing trade bearing on the health of the workers and the effectual regulation of various like trades. The prize was awarded to *Ducrot* for his work on *Le Saturnisme dans la Typographie*.

During the last decade a number of investigations were made in Germany, France and England, reference to which may be found in *Albrecht*, *Heimann*, *Sommerfeld*, *Rambousek*, *Roth*, *De Rooy*s, *Hahn*, *Beyer* and others.

In the United States there have also been investigations made by the Industrial Commission created by an act of Congress in 1898, by the several commissioners of labor and factory inspectors and by the International Commission on Industrial Diseases.

Opinions of Investigators as to the Dangers of the Trade:

It is unnecessary here to give the opinion of all the various investigators who have written upon the subject of the dangers of the printing trade to the workers. The opinion of *Stumpf* as to the frequency of tuberculosis as a cause of mortality has already been quoted.

Albrecht, speaking of the results of decennial statistics and referring to 799 cases of deaths among compositors, says: "It may be taken as a fact that printers are more liable to tuberculosis or consumption than men engaged in most other trades." He also finds a relatively high mortality among workers in this industry, tuberculosis being one of the chief causes.

Heimann, who wrote in 1895 on the occupational diseases of printers and who found that the average age of printers is not much less than the average age of other workers in Berlin, was compelled to the conclusion, however, that the most frequent cause of death is tuberculosis of the lungs, which occurs more often in this trade than in others.

Six years' statistics, 1897 and 1903, of the International Typographical Union in North America show 2,994 deaths, referring to which *Commons* says: "The most striking effects seen are the number of deaths of young men and the number of deaths from consumption." (1)

(1) Quoted by *Beyer*.

There is less reliable data on the frequency of lead poisoning among printers. This disease unquestionably undermines the health of printers. It is but rarely manifest in acute forms and works its mischief in an insidious way, sowing the seeds of a predisposition to other diseases, especially tuberculosis; hence the very close relation of chronic plumbism and pulmonary tuberculosis.

In an investigation undertaken among linotype and other machine compositors in 1907 there were only 55 cases of plumbism among the 3,002 workers; but 189 cases of digestive disturbances, 129 cases of constipation and 403 cases of defective vision among the same workers distinctly point to chronic lead intoxications, although there were no special diagnostic signs of plumbism.

As Sommerfeld says: "We but rarely meet acute lead poisoning. As a rule the intoxication is very gradual and insidious. The disease never begins with distinctive diagnostic signs, but rather with general reduction in health, especially disturbances of the digestion."

According to Oliver there were 200 cases of lead poisoning among printers between 1900 and 1909; 17 of these were fatal.(1)

The substitution of machine for hand composition does not seem to have improved the health conditions of the workers, and as Ducrot says, "The suppression of hand composition and its replacement by machine composition has not reduced the danger;" while the Holland section even comes to the conclusion that "The typesetting machine has increased the dangers of lead poisoning."(2)

Dangers to Women and Children:

The investigations have especially proven the bad effects of this trade upon women and children.

In the United States there are at present about 40,000 women in the printing trade. Of the 9,047 employees of the establishments investigated by the New York State Factory Commission 1,390 were women, a percentage of 15.4. Women were found in nearly all departments of the trade, but a majority were in the

(1) Industrial Lead Poisoning in Europe. Bulletin Bureau of Labor No. 95.

(2) De Rooy's, quoted by Beyer — Die Volkswirtschaftliche und Sozialpolitische Bedeutung der Einführung der Sets machine im Buchdruckgewerbe, p. 134.

composing room. Some were employed as linotypers and some at presses. There were comparatively few in the photo-engraving establishments.

Women have long been associated with the printing trade. It is said that nuns in one of the Italian convents worked as compositors as early as the end of the fifteenth century. In the United States women printers were comparatively common in the pioneer days, some of them being employed in printing colonial newspapers as well as books and pamphlets as early as 1690. Jennie Hirsch managed a printery in Boston. Margaret Draper printed for the Governor and Council of Massachusetts. The printing trade seems to have had a strong attraction for the whole family of Benjamin Franklin. His sister-in-law, who lived in Rhode Island, carried on a considerable printing business. Mary Catherine Goddard issued the first print of the Declaration of Independence. In France there were women printers towards the close of the eighteenth century, but in England we do not find record of them in any number until considerably later. However, from the middle to the end of the nineteenth century a good many women had come into the trade. With the growth of the women's rights movement the number increased, as women felt that the work was peculiarly adapted to them. In 1860 Mrs. Emily Faithful started the Victoria Press, in which only women were employed.

The exact proportion of increase among women in the trade is hard to fix. Statistics of "industrial printing and publishing" are not obtainable except for very recent years, and from them it is not always possible to say what part of the work of printing is being done by women. In book and job printing, however, the increase in the percentage of women is as follows:

1880.....	12 per cent
1890.....	19 per cent
1900.....	20 per cent
1905.....	23 per cent

In printing and publishing the number of women increased from 14 per cent in 1890 to 20 per cent in 1905.

At the time of the introduction of typesetting machines it was predicted that with the simplification of the work the employment

of men would be replaced by that of women and minors. This probably would have been the case had it not been strenuously opposed by the thoroughly organized and awakened printing trade in the United States. It is a fact, moreover, that in those places in the United States where labor organizations have not been able to stem the tide of women coming into this industry the increase has been enormous.

Grave as are the dangers to the life and health of male workers in the printing industry, these are still greater in the case of women. It is well known that women are more subject to lead poisoning than men, and their general constitution is apt to fall a prey to the dangers of the trade sooner than that of the more robust male workers.

Since the introduction of typesetting machines in Germany and France, with a resulting increase in the number of women workers, there have been several investigations followed by restrictions and in certain places by total prohibition of the work of women at machines. There is a general consensus of opinion among investigators as well as legislators that women should not be allowed to participate in any trade where there is a possibility of lead poisoning.

The new Austrian regulations of printing establishments provide that: "In printing and type foundries of any kind, where the workers come in contact with lead, no women workers should be employed." This forbids not only work at typesetting machines, but also hand composition by women.(1) According to a communication of the *Ministre du Travail*, such prohibitions have also been contemplated in France.(2)

As to the work of minors in the printing trade, the prevalence of tuberculosis among young persons has already been referred to in this chapter, and the danger of employing minors has been attested by nearly all investigators. Not only has legislation been introduced to limit the work of minors in this trade, but in England as well as in Germany stringent medical examination is made of all minors entering this industry, and a large number of applicants rejected. The opinion is prevalent that no minors under eighteen should be allowed to work in printing establish-

(1) See Beyer (*supra*), p. 140.

(2) Beyer — *ibid.*

ments, and then only after a thorough physical examination. Hahn as well as Toleky advocate a thorough medical examination of all workers in lead every three months, especially of minors.

The Dangers of the Trade:

The above quotations and statements prove that investigators and scientists are fully aware of the dangers of the printing trade to the health of the workers. These statements are substantiated by abundant statistical data of the mortality rates among printers. It is unnecessary to quote here this data which can be found in the various reports of the Typographical Union and the numerous works which have been referred to above.

What are the dangers in the trade which are injurious to the workers? As has been stated, the chief dangers are lead poisoning and tuberculosis. Lead poisoning is caused by the lead dust which is so common in printing shops and also by the fumes arising from the lead in the various processes of machine composition. The dust in the shops, especially that in the type boxes, contains a large amount of lead and some antimony. Professor Steingraber analyzed the dust from a type box in Cracow and found it contained 16.43 per cent of lead. Dust from the top of stove in a composing room contained 0.24 per cent of lead, while that from the floor of a gallery 16.4 feet high in the composing room contained 0.37 per cent of lead.(1) Much of the lead dust is undoubtedly inhaled by the workers. A great deal of dust is raised by the foolish and highly insanitary method so prevalent in old printeries of cleaning the dust out of the type boxes with bellows. Much lead dust is also deposited on the fingers and hands of the workers as well as upon their clothes, and remains there from lack of proper washing facilities. Then dust is very often ingested with their food, which is commonly eaten at the workstand in the printing shop.

(1) Oliver; Bulletin of Bureau of Labor, 1895, p. 69.

TABLE 5. MORTALITY OF PRINTERS BY PRINCIPAL CAUSES, 1907-1910.
TABLE 6. PROPORTIONATE MORTALITY BY CAUSES AND AGES.

CAUSE OF DEATH.	AGES 15 AND OVER.		AGES 15-24.		AGES 25-44.		AGES 45-64.		AGES 65 AND OVER.	
	Num-ber.	Per Cent.	Num-ber.	Per Cent.	Num-ber.	Per Cent.	Num-ber.	Per Cent.	Num-ber.	Per Cent.
Typhoid.....	23	2.3	16	7.4	6	1.4	1	0.4	....	....
Alcoholism.....	16	1.6	1	0.5	8	1.9	6	2.2	1	1.2
Cancer.....	24	2.4	1	0.5	3	0.7	18	6.7	2	2.4
Tuberculosis.....	384	38.4	107	49.8	214	49.5	59	21.9	4	4.7
Old age.....	1	0.1	....	....	....	....	....	....	1	1.2
Apoplexy and par- alysis.....	41	4.1	1	0.5	7	1.6	17	6.3	16	18.8
Other nervous dis- eases.....	30	3.0	7	3.3	9	2.1	10	3.7	4	4.7
Heart diseases.....	100	10.0	11	5.1	34	7.9	41	15.3	14	16.5
Pneumonia.....	81	8.1	18	8.4	31	7.2	25	9.3	7	8.2
Other respiratory diseases.....	26	2.6	2	0.9	12	2.8	7	2.6	5	5.9
Liver diseases.....	32	3.2	....	....	14	3.2	16	6.0	2	2.4
Other digestive dis- eases.....	38	3.8	11	5.1	11	2.5	12	4.5	4	4.7
Urinary diseases.....	89	8.9	11	5.1	27	6.3	36	13.4	15	17.6
Accidents.....	57	5.7	19	8.8	29	6.7	7	2.6	2	2.4
Suicide.....	20	2.0	7	3.3	7	1.6	2	0.7	4	4.7
All other causes....	39	3.9	3	1.4	20	4.6	11	4.0	4	4.7
All causes.....	1,001	100.0	215	100.0	432	100.0	268	100.0	85	100.0

Table X-A, page 32, Exhibits of the Prudential Insurance Company of America, International Congress on Hygiene and Demography, September, 1911.

There is some controversy as to the danger from the fumes which are generated in linotype melting pots. There is, however, no doubt as to the dangers of handling the scrap lead from the linotype machines.

To the distinctive dangers of lead dust and fumes in the printing shops must be added the increased temperature caused by the artificial illumination and the heating of metal in the machines. The confined air which those in the shops are compelled to breathe, the lack of ventilation, the artificial illumination and improper lighting, the high temperatures, the dust which is thick in the air near the type cases, the lack of exercise by the workers and the nervous strain upon them, all these are distinctly deleterious elements in the trade.

The special regulations controlling the printing trade in Germany and Switzerland may be found in the appendix to this report.

The International Typographical Union:

The best sign of the awakening of the working classes themselves as to the dangers of their occupation and their efforts to

eliminate these dangers may be found in the strong and healthy agitation of the last few years by the officers and members of the Typographical Union. In his annual address President Lynch speaks of the health problem among printers as follows:

“ We can prolong the average life of our membership materially if we can make the working conditions as they should be. We are justified in insisting, and radically insisting, on reasonable comfort for our members in their daily employment. We gain little in establishing high wage scales if our members' lives are shortened by the conditions under which they earn these high wage scales. Tuberculosis is a slow and treacherous disease; it advances imperceptibly until it is ready to strike and utterly incapacitate its victim. Because of its insidiousness there is an indifference to it that is criminal. A dozen men are killed in battle, or shipwreck or explosion, and the papers and the people are horrified thereat. A thousand human beings are slaughtered by tuberculosis and the sacrifice of human life passes unnoticed. The anti-tuberculosis societies are arousing the people, even though slowly. The International Typographical Union is doing its part in this great campaign.”

The International Typographical Union of North America was the outgrowth of the Typographical Union. It was organized in 1869 for mutual protection and the betterment of conditions in the trade. It originally included all branches of the printing trade, but with the growing tendency toward specialization of skill the pressmen, stereotypers, electrotypers and the bookbinders have formed separate international organizations of their own. These organizations, although independently supported, are still affiliated with the typographical union.

The Home:

The Childs-Drexel Home for Union Printers has been established for some years at Colorado Springs. Any sick member of the union of five years standing may be admitted to the home; which is supported by dues amounting to fifteen cents per month from each member. Applicants numbering considerably over 1,000 have been admitted to the home since its institution in July, 1892; the majority of these are consumptives.

Old Age Pension and Mortuary Benefit:

An old age pension has been provided by the union as follows:

Section 6, article V, of the by-laws of the International Typographical Union provides for the payment of the old-age pension to any member of the International Typographical Union who has reached the age of sixty years and who has been in continuous good standing for a period of twenty years, or any member who has reached the age of seventy years and who has been in continuous good standing for a period of ten years and who finds it impossible to secure sustaining employment, or any member having a continuous membership of twenty years who by reason of his affliction is totally incapacitated for work and whose application for admission to the Union Printers' Home has been rejected by the trustees thereof may receive the sum of \$5 per week subject to the provisions hereinafter set forth.

There is also a burial fund or mortuary benefit which is supported by the members of the union.

Home of the Printing Pressmen:

The International Printing Pressmen and Assistants' Union have recently built an admirable home in Tennessee for aged and indigent members and for patients suffering with tuberculosis. They have also built at the same place a technical school.

APPENDIX TO CHAPTER VI.

GERMANY.

ORDER OF THE FEDERAL COUNCIL OF JULY 31, 1897, REGULATING
LETTERPRESS PRINTING WORKS AND TYPE FOUNDRIES IN
PURSUANCE OF SECTION 120E OF THE INDUSTRIAL CODE.(1)

I. In rooms in which persons are employed in setting up type or manufacture of type or stereotype plates the following provisions apply:

1. The floor of workrooms must not be sunk deeper than half a meter (1.64 feet) below the ground. Exceptions may only be granted by the higher administrative authority where hygienic

(1) The special rules for letterpress printing in Germany are directed as much against tuberculosis as against lead poisoning.

PRINTING SHOPS



GRADE OF CLEANLINESS

Inadequate light in shops
Mechanical ventilation
Special devices



LIGHT AND VENTILATION

Adequate washing facilities
Separate lunch rooms
Separate dressing rooms



SPECIAL CONVENIENCES

* The % for the separate dressing rooms is taken of the total number of establishments (55) investigated in 1912. 1914 is not taken into consideration.

CHRONOLOGICAL

1800. The first of the year was a very cold day, and the wind was very strong. The snow was very deep, and the roads were very slippery. The people were very busy, and the shops were very crowded. The weather was very bad, and the people were very angry. The day was very long, and the night was very dark. The people were very tired, and the shops were very empty.

1801. The first of the year was a very cold day, and the wind was very strong. The snow was very deep, and the roads were very slippery. The people were very busy, and the shops were very crowded. The weather was very bad, and the people were very angry. The day was very long, and the night was very dark. The people were very tired, and the shops were very empty.

1802. The first of the year was a very cold day, and the wind was very strong. The snow was very deep, and the roads were very slippery. The people were very busy, and the shops were very crowded. The weather was very bad, and the people were very angry. The day was very long, and the night was very dark. The people were very tired, and the shops were very empty.

1803. The first of the year was a very cold day, and the wind was very strong. The snow was very deep, and the roads were very slippery. The people were very busy, and the shops were very crowded. The weather was very bad, and the people were very angry. The day was very long, and the night was very dark. The people were very tired, and the shops were very empty.

conditions are secured by a dry area and ample means of lighting and ventilating the rooms.

Attics may only be used as workrooms if the roof is underdone with lath and plaster.

2. In workrooms in which the manufacture of type or stereotype plates is carried on the number of persons must not exceed such as would allow at least fifteen cubic meters of air space (529.31 cubic feet) to each. In the rooms in which persons are employed only in other processes there must be at least twelve cubic meters of air space (423.450 cubic feet) to each person.

In cases of exceptional temporary pressure the higher administrative authority may, on the application of the employer, permit a larger number in the workrooms for at the most thirty days in the year, but not more than will allow ten cubic meters of air space (352.87 cubic feet) for each person.

3. The rooms must be at least 2.90 meters (8.528 feet) in height where a minimum fifteen cubic meters are allowed for each person, in other cases at least three meters (9.84 feet) in height.

The rooms must be provided with windows which are sufficient in number and size to let in ample light for every part of the work. The windows must be so constructed that they will open and admit of complete renewal of air in workrooms.

Workrooms with sloping roof must have an average height equal to the measurements given in the first paragraph of this section.

4. The rooms must be laid with a close fitting impervious floor which can be cleared of dust by moist methods. Wooden floors must be smoothly planed and boards fitted to prevent penetration of moisture.

All walls and ceilings must, if they are not of a smooth washable surface or painted in oil, be lime-washed once at least a year. If the walls and ceilings are of a smooth washable surface or painted in oil they must be washed at least once a year and the oil must, if varnished, be removed once in ten years, and if not varnished, once in five years.

The compositors' shelves and stands for type boxes must be either closely ranged around the room on the floor so that no dust can collect underneath or be fitted with long legs so that the floor can be easily cleaned of dust underneath.

5. The workrooms must be cleared and thoroughly aired once at least a day, and during the work hours means must be taken to secure constant ventilation.

6. The melting vessel for type or stereotype metal must be covered with a hood provided with exhaust ventilator or chimney with sufficient draught to draw the fumes to the outer air.

Typesetting and melting may only be carried on in rooms separate from other processes.

7. The rooms and fittings, particularly the walls, cornices and stands for type, must be thoroughly cleansed twice a year at least. The floors must be washed or rubbed over with a damp cloth so as to remove dust once a day at least.

8. That type boxes must be cleansed before they are put in use, and again as often as necessary, but not less than twice at least in the year.

The boxes may only be dusted out with a bellows in the open air, and this work may not be done by young persons.

9. In every workroom spittoons filled with water, and one at least for every five persons, must be provided. Workers are forbidden to spit upon the floor.

10. Sufficient washing appliances with soap, and at least one towel a week for each worker, must be provided as near as possible to the work for compositors, cutters and polishers.

One wash hand basin must be provided for every five workers, with an ample supply of water laid on.

The employer must make strict provision for the use of the washing appliances by workers before every meal and before leaving the works.

11. Clothes put off during working hours must either be kept outside the workroom or hung up in cupboards with closely fitting doors or curtains which are so shut or drawn as to prevent penetration of dust.

12. Artificial means of lighting which tend to raise the temperature of the rooms must be so arranged or provided with counteracting measures that the heat of the workrooms shall not be unduly raised.

13. The employer must draw up rules binding on the workers which will insure the full observance of the provisions in sections 8, 9, 10 and 11.

II. A notice must be affixed and a copy sent to the local police authority showing (a) the length, height and breadth of the rooms; (b) the air space in cubic measure; (c) the number of workers permitted in each room.

A copy of rules 1 to 13 must be affixed where it can be easily read by all persons affected.

III. Provides for the method of permitting the exceptions named above in section 2 and 3 and makes it a condition of reduction in cubic air space for each person employed as typefounder or compositor that there shall be adequate mechanical ventilation for regulating temperature and carrying off products of combustion from workrooms.

SWITZERLAND.

REGULATIONS OF FEBRUARY 12, 1898, FOR PREVENTING SICKNESS IN PRINTING HOUSES AND TYPE FOUNDRIES.(1)

The two most important dangers to the health of printers and type founders, tuberculosis and lead poisoning, can be avoided if close attention is paid to the following rules which we now recommend to employers and employees:

1. Each workroom should contain a minimum air space of 12 m³ per operative.

2. The floor should be firm and smooth; where this is not the case it should be so constructed that it may be easily washed and all dust and dirt so removed.

3. The surfaces of the walls should be such that they can be washed or painted. They should be either washed twice a year or repainted once a year.

4. The work tables or benches should be so arranged that the floor beneath them can be easily washed.

5. The floors of the workrooms should be washed daily and all other surfaces where dust might settle twice a week.

(1) La Protection Légale du Travail en Suisse, Jean Sigg, p. 148.

6. At noon and after work the workrooms should be thoroughly ventilated. Besides there should be regular ventilation during the hours of work.

7. The cases should not be cleaned except in the open air.

8. In foundries adequate exhausts must be provided to carry off fumes and vapors from all furnaces or crucibles wherein they are generated.

9. Washing facilities with towels and soap for the employees must be located in convenient places.

10. It is especially forbidden to spit upon the floor. A sufficient number of cuspidors shall be provided and filled with wet sand. They should be emptied regularly.

11. Smoking will not be tolerated in the workrooms.

12. In rooms where there is lead dust no food, water, coffee, etc., shall be left exposed to the air.

13. Workers must wash before eating.

14. All employees in lead should have special working clothes. Their street clothes should be placed in closed lockers or in a room other than the workroom.

15. These rules should be placarded in all the shops.

CHAPTER VII

MISCELLANEOUS REPORTS.

1. Diseases of the ear and upper respiratory tract among workers in factories, by Dr. Otto Glogau.
2. The inspection of establishments, producing, refining and using word Alcohol, by Dr. F. E. Breithut.
3. Personal histories of 132 chemical workers in plants at Niagara Falls, by Mrs. Marie S. Orenstein.
4. Description of forty accidents occurring in plants at Niagara Falls, by Miss Grace Potter.
5. Thirty-one cases of industrial lead poisoning traced in Niagara Falls, by Miss Gertrude E. Smith.
6. Comparative tables of accidents in the chemical industries, compiled by Jacob Feldbaum, B. S.

1.

DISEASES OF THE EAR AND THE UPPER RESPIRATORY TRACT AMONG WORKERS IN FACTORIES.

BY

OTTO GLOGAU, M. D.

A Preliminary Report by Dr. Otto Glogau, Consulting Otologist, Germ. Odd Fellows Orph.; Adj. Oto-laryngologist, Bronx Hospital; Chief, Ear, Nose and Throat Dept., St. Marks and Bronx Hospital Dispensaries.

There are quite a number of occupational diseases that because of their slow and gradual development are noticed by those affected only after the disease has progressed too far to be improved by treatment. An early medical examination might have discovered these conditions in time to prevent the development of disease by proper medical or surgical treatment.

Among the frequently neglected occupational diseases are those connected with the functions of the ear and of the upper respiratory tract. It would be of great value to learn to what degree the

functions of the nose, throat and larynx are interfered with by the dust, dirt and the minute particles of material, gaseous substances, etc., which are found in abundance in certain factories. It would be of even greater value to find by investigations the exact damage done to the organ of hearing by the continuous influence of noises which are concomitant to the different processes in various manufacturing establishments.

Through the courtesy of Dr. George M. Price, the Director of Investigation of the New York State Factory Investigating Commission the writer was enabled to examine the ear and upper respiratory tract of a number of industrial workers.

Only those factories were investigated in which there was excessive dust, dirt or extreme noise. Two ostrich feather factories (examined forty-five girls and four men), three fur factories (examined fifty girls and twelve men), and one cordage mill (examined thirty-four girls and ten men) were investigated. Altogether 155 employees were examined in these six factories. In the small factories all of the employees were examined; in one large fur factory and in the cordage mill it was possible to examine only a few of the workers.

In order to facilitate the work an examination card was used. The examination was thorough, taking on an average twenty minutes for each individual case.

COPY OF CARD USED IN EXAMINATION OF 155 WORKERS IN
OSTRICH FEATHER AND FUR FACTORIES AND IN CORDAGE
MILL.

Line:

Factory No.

Name

Check number

Sex

Age

How many years in this line?

What line before?

General history:

Nose: Previous history:

- Operations
- Mouth breathing
- Colds
- Discharge
- Headaches
- Loss of smell

Present state:

- Septum
- Turbinates
 - Right
 - Left
 - Inferior
 - Middle
 - Sinuses

Particles of working material in nose

Adenoids

Other findings

Diagnosis:

Throat: Previous history:

- Operations
- Sore throat

Present state:

- Tonsils
- Abscess
- Uvula
- Pharynx

Particles of working material in throat

Diagnosis:

Ear: Previous history:

- Operation
- Discharge
- Impairment of hearing
- Noises

Present state:

Right External ear Left

Drum

Middle ear

Inner ear

Conversation voice

Whispered voice

Weber

Schwabach

Rinne

C 1

C 4

Nystagmus

Spontaneous

Rotatory

Caloric

Galvanic

Disturbances of equilibrium

Other findings

Diagnosis:

The writer used an electrically illuminated speculum and similarly illuminated pharyngoscope for his examination of the ear, larynx and nasopharynx and an electrically illuminated headlight for the examination of the nose and throat. A pocket battery provided the necessary current.

The organ of hearing was tested by means of three tuning forks (the lower, middle and high tuning forks of the Vienna Ear Clinic), and different tests were applied to enable a differentiation between the affections of the middle and inner ear. Also the distances for the perception of both conversation voice and whispered voice were noted.

The following is a preliminary table of the results of the examination:

TABLE SHOWING RESULTS OF EXAMINATION OF 155 WORKERS AS TO AFFECTIONS OF THE EAR AND UPPER RESPIRATORY TRACT.

FACTORY EXAMINED.	OSTRICH FEATHERS.		FURS.			CORDAGE MILL.		Total number examined.
	I.	II.	III.	IV.	V.	VI.		
	Number examined.		Number examined.			Number examined.		
						Male.	Female.	
	15	34	10	13	39	19	34	155
<hr/>								
Diseases:								
Rhinitis.....	15	31	8	9	35	8	22	128
Deformities of the septum.....	11	18	6	10	17	9	16	87
Pathological Changes of the Turbinates:								
Hypertrophies.....	6	12	2	2	8	2	4	136
Degenerations.....	2	3	7	8	24	4	17	65
Adenoids.....	1	3	1	...	3	2	4	14
Sinusitis.....	...	1	...	2	...	...	4	7
Pharyngitis.....	13	27	6	8	32	5	24	115
Tonsils, hypertrophy.....	4	13	5	2	2	2	...	28
Middle ear catarrh.....	7	12	7	11	15	9	21	82
Inner ear affections.....	...	...	1*	1	3	10	34	49
Particles of working material in nose.....	10	30	8	11	32	6	22	119
Particles of working material in throat.....	6	27	5	7	25	3	18	91
Laryngitis.....	1	3	1	2	4	2	4	17

* A case of hysterical deafness.

The deductions which may be made from the examination and from the table are as follows:

First. The upper respiratory tract and ear are undoubtedly damaged by the dust that contains minute particles of ostrich feathers, fur and cordage materials and by the noises found in the cordage mill.

Second. In several instances the nose was entirely filled up with dust, while in others only the septum or the *turbinates* were affected. From the nose this dust dropped down directly into the throat. In 119 of the 155 workers examined particles of working material were found in the nose; in 91 cases such particles were lodged in the throat.

Third. When minute particles of dust irritate the nasal mucous lining for any length of time the respiratory organs within the nose, the so-called *turbinates*, are damaged. The *turbinates* consist of spongy tissue; their function is to filtrate, warm and

moisten the air. The pathological changes of the *turbinates* brought about by the irritation of the workshop dust consist of *hypertrophies* or degenerative processes with either the formation of *polypi* or complete *atrophy*. By any of these conditions the function of the *turbinates* is interfered with and the breathing space within the nose (in *hypertrophies*) is reduced to a minimum.

Fourth. Among the 155 workers examined thirty-six *hypertrophies* and sixty-five degenerative processes of the *turbinates* (mostly *polypi* and in only a few instances *atrophies*) were found. By these changes of the soft tissues within the nose normal breathing becomes impossible, especially when congenital or acquired deformities of the bony wall or *septum* which separates the two nasal cavities are present. These deformities consist in most instances of deviations (bulging of the cartilaginous and bony *septum* to one side or the other) or of bony outgrowths called *spurs*. Such deformities of the *septum* were observed in eighty-seven cases. The soft and bony nasal obstructions lead to the development of adenoids in your persons (fourteen cases) and later on to inflammation and hypertrophy of the tonsils (twenty-eight cases) or to chronic inflammation of the larynx, etc. (seventeen cases).

Fifth. A chronic inflammation of the mucous lining of the nose, *rhinitis*, was noticed in 128 cases, and a chronic inflammation of the mucous lining of the throat, *pharyngitis*, was detected in 115 cases. By the affection of the turbinates the nasal accessory cavities, *sinuses*, become involved and show suppuration. (Seven cases of *sinusitis*.)

Sixth. The ear, as is well known, is connected with the nose by means of the *eustachian* tube. Through this channel the ear receives the amount of air necessary to enable it to perform the normal function of hearing. If the nose is stuffed up on account of the soft and bony obstructions the ear is not properly provided with air and dries out. Thus chronic middle ear catarrhs with consequent impairment of hearing arise (eighty-four cases).

Among the furriers, where the changes of the *turbinates* were mostly of the degenerative type, the middle ear catarrh (thirty-three cases of the sixty-two examined) had in four cases already progressed to an affection of the inner ear. (The one case of

hysterical deafness does not belong to this class.) Such progression is the more remarkable because there was very little noise in the factory. The inner ear — the acoustic nerve proper — may in the course of time be affected by the pathological changes within the nose and the middle ear.

Seventh. In the cordage mill the air was filled with minute particles of jute, hemp, etc., and there was excessive noise due to the simultaneous working of hundreds of machines. Of the forty-four workers examined in this mill thirty showed rhinitis, twenty-nine pharyngitis, twenty-seven pathological changes of the turbinates, six hypertrophies, twenty-one degenerative processes (polyps, etc.), twenty-eight mill dust in the nose and twenty-one mill dust in the throat. In twenty-eight cases catarrh of the middle ear was found, and in every one of the forty-four cases examined there was an affection of the acoustic nerve. In six of the girls this affection was just beginning, while in the other cases it had already progressed to a more or less pronounced degree. The hearing, therefore, was impaired in all these cases.

Eighth. The above affections of the nose, middle and inner ear were in most instances not known to those afflicted with them. The workers gradually become accustomed to the action of the dust and the noise. The above-named ailments of the upper air tract and the ear develop so slowly that the sufferer becomes aware of them only when there arise such symptoms as pain, pus, fever, severe headaches, complete obstruction of the nose and almost total deafness. At such a stage of the affection it is usually too late to restore the respective organs to their normal function.

Preventive Measures: In order to minimize the dust evil mechanical exhausts should be installed in all dusty factories. In addition to such special devices the workers should be provided with proper respirators. Those in common use are too clumsy and stop the workers from conversing freely. The writer is experimenting on a small respirator which can be introduced into the nostril and is therefore hidden from view. It consists of a very thin metal sieve so constructed that it would retain even the smallest particles of mill dust.

Regular medical examination of the workers in the dusty trades should be compulsory. Every employee should be examined when

he first enters the factory and if necessary should undergo medical or surgical treatment in order to restore normal and nasal breathing. He should furthermore be examined every six months at least in order to arrest the development of affections of the upper respiratory tract and the ear.

If it appears that the impairment of hearing due to the factory noise has progressed to such a degree that deafness will sooner or later result the employer should transfer this worker to a department of his factory where there is comparatively no noise.

Experiments upon animals and examinations of artillerymen have proved that a great part of the air concussion is transmitted to the acoustic nerve by the ground on which the individual stands and not by the air alone. The movements of the machine are imparted to the floor and from thence to the body of the worker, and in this way reach and affect the acoustic nerve. An excellent preventive measure would be the isolation of the worker from the floor by the use of heavy shoes with rubber soles or thick rubber floor covering. The worker should also wear some easily attachable sound-damping appliance in the shape of a cap. Cotton in the ear will close the ear canal, but will not prevent noises from reaching the acoustic nerve by means of bone conduction.

The workers in the trades in which there are loud noises and excessive dust should be educated as to the dangers of their occupation and should be made to realize the necessity for occasional medical examination of the ear and the upper respiratory tract.

In conclusion I would recommend that the employer be held responsible for the occupational diseases resulting through neglect of precautionary and preventive measures.

2.

THE INSPECTION OF ESTABLISHMENTS PRODUCING, REFINING OR USING WOOD ALCOHOL.

BY

FREDERICK E. BREITHUT, Sc. D.

CONTENTS.

- I Types of establishments inspected; number of each.
 - II The conditions in
 - (a) Wood distilleries
 - (b) Refineries
 - (c) Establishments using wood alcohol.
 - III Summary and conclusions:
 - (a) Condition of the workers
 - (b) Dangers to the workers
 - (c) Their need of protection
 - (d) What the manufacturers and chemists can do
 - (e) What the state should do.
-

On the recommendation of Prof. Charles Baskerville, I was appointed as chemical inspector to the New York State Factory Investigating Commission during the months of July and August, 1912. Part of my time was spent in an investigation of the wood alcohol industry, and especially in the inspection of establishments producing, refining or using wood alcohol.

As indicated, three types of establishments were inspected:

- (a) Those in which the crude wood alcohol is produced by the destructive distillation of wood.
- (b) Those in which the crude product is refined.
- (c) Those in which the wood alcohol is used, usually as a solvent.

The following table gives a general survey of the inspections:

NATURE OF INDUSTRY.	Number of establishments inspected.
<i>a</i> Wood distilleries.....	6
<i>b</i> Refineries.....	3
<i>c</i> Establishments where the processes involve the use of wood alcohol	
Artificial flowers.....	1
Breweries.....	1
Chemical products.....	2
Dyes.....	2
Electrical supplies.....	1
Film distributors.....	2
Film manufacturers.....	1
Furniture.....	6
Hats (hair-felt).....	3
Hats (wool-felt).....	3
Pharmaceutical preparations.....	1
Piano keys.....	1
Pianos.....	2
Shellac and varnish.....	4
Shoe polish.....	1
Shoes.....	1
Soaps and perfumes.....	4

(a) WOOD DISTILLERIES

Many of the wood distilling plants are located directly on the border line between New York and Pennsylvania, so that of the six plants inspected, four were located in Pennsylvania and two in New York. It was not deemed necessary to inspect every plant, as the conditions are essentially the same.

The work people have long hours of labor and a wage which might have a bearing upon any conditions observed. These do not come strictly within the province of this report. The workers actually do not seem to be exposed to any great dangers. On the whole, the men appeared to be healthy and robust, and many of them had been engaged in the industry for long periods of time.

There is only one stage of the process in which all (employees and employers) were agreed that the eyes of the operatives are sometimes affected. This process is technically termed "making a tub." It consists in the neutralization of acetic acid with lime. Formerly the mixing was done in an open vat, by hand, by means of a long wooden paddle resembling an oar. It is now done in a closed vat and by machinery (at least such was the case in the establishments visited by the inspector). In the old days of hand stirring, men frequently "went blind" for periods

of six to seventy-two hours. The workmen describe this "going blind" as exceedingly painful. The eyelids are swollen and irritated, the eyes closed up tight, and the eye balls feel as if "sand" or "broken glass" were rubbing them. Nowadays "going blind" for this part of the process is rare, in fact almost unknown.

At the next stage of the process, the moist acetate of lime is transferred for drying to the "kiln room," which is located above the ovens. The "kiln room" is very hot, but the workers do not stay there for any great length of time. The packing of the acetate of lime is a dusty process, but this, also, takes only a short time — the day's product being packed in an hour to an hour and a half.

All the inspections were made during the summer months and it should be noted that the workmen all stated that conditions were worse in the winter. This seems quite natural, as the plants are located in the woods, and, owing to the cold weather, the buildings are no doubt closed up tighter during this season of the year.

Some of the statements of the workmen are quoted herewith. One said:

"Three things cause trouble with my eyes — overwork, boosing and using soap on the face near the eyes after getting them sore. Sleep and rest are the only remedies for sore eyes. Some of us put scraped potatoes on them."

A second man stated:

"Cold water helps them, but I find it best to thaw 'em out by standing near the hot furnace."

It sometimes happens that when there is a leak in the still, or for some other cause, it is necessary for a man to get down into a still; if he does not wait until the still is entirely freed from vapors, his eyes will be irritated. This is hardly a condition calling for remedial legislation, however, as it is but a sporadic state of affairs and one which can be solved more easily by exercise of more caution on the part of those involved.

Summarizing the observations of the inspector and the opinions of those engaged in the work of wood distillation, it would seem that the dangers involved are not very great, but, on the

other hand, it would be desirable to make it compulsory that the process of "making a tub" be done by machinery in a covered vat and that adequate ventilation be insisted upon.

(b) REFINERIES

The processes involved in the refining of crude wood alcohol are more or less automatic and closed. Therefore, exposure of the men thus employed is unlikely. In a single plant in this State where it is said that 90 per cent of the wood alcohol of this country is refined, but three workmen are needed at a time and their work is almost entirely supervisory in character.

The only place where the operator is actually exposed to the vapors is in filling the barrels or drums. In two of the three refineries visited, this process was carried on in a large room near open windows. In these places there was scarcely any odor and the workmen stated that they never had any trouble. In the third refinery, however, the filling was done in a dark place, far removed from the windows. The odor of wood alcohol was strong and an open puddle of the liquid had formed under the outlet. Here the worker complained of irritated eyes and the appearance of his eyes bore out his statement, he also stated that he had recently been "blind" for a period of eighteen hours. A pipe leading from the bottom of the tank to the immediate neighborhood of the windows would have solved this problem.

(c) ESTABLISHMENTS USING WOOD ALCOHOL

As may be seen by a perusal of the foregoing sections, the dangers to the workmen engaged either in the production of crude wood alcohol or in its refinement, are, on the whole, not very great. On the other hand, in the use of wood alcohol in the arts, liability of exposure to its vapor and the ills incident thereto, has been found to be very much greater and, as a consequence, some conditions have been observed which should be remedied. However, none of these conditions is inherent in the nature of the processes involved; and all of them can be avoided by the application of comparatively simple precautionary measures.

A selected number of special cases will suffice to show the general conditions.

In many instances the evidence is quite conflicting. Thus of the three felt (hair) hat factories visited, one used no wood alcohol except the small quantity in the denatured alcohol employed. The second factory used *only* wood alcohol and insisted that denatured alcohol was not as good. The third factory employed both wood alcohol and denatured alcohol, and was of the opinion that the denatured was as good as the wood, except that the latter evaporated so much more quickly that its use was necessary in executing "rush" orders. In the face of such conflicting statements, it appears unfair to the manufacturer to insist upon the exclusion of wood alcohol. On the other hand, it seems only fair that the employee, forced to use wood alcohol, should receive such protection from its toxic effects as can be provided for easily. And such protection is frequently not provided.

One of the largest users of wood alcohol in the State of New York is located in Schenectady. This establishment is listed under electrical supplies. It has 15,000 employees, of whom one-eighth are women. Eleven of the buildings of this company were visited by the inspector, and many of the workers and their families were interviewed by another investigator.

As a result of the rapid survey of the inspector and the more thorough intensive study of the investigator, it may be stated that some of the conditions found, merit immediate attention. For example, in one building the employees are engaged in dipping pieces of cambric into a solution of shellac in wood alcohol; this solution is contained in large open vats and the pieces of cambric, after dipping, are hung up to dry. The vapors escape into the open room, and the workmen are thus exposed, not only to the vapors of the open vats, but also to those evaporating from the cambric.

The results are about what might be expected. The foreman in charge stated that his eyes are always inflamed and at night they pain him so that he cannot sit in a room where there is artificial light. He began this work five years ago and, at first, the wood alcohol made his hands swell so that he had to stay

home a week. Another workman described similar effects in his own case. Both men stated that they frequently have to run to the window to get the fresh air. The foreman also stated that he had had twenty-two men working under him and all of them had the same trouble, in fact, he knows of none who failed to be so affected. A third workman reported as follows: he worked there four months, eyes were sensitive to light, exceedingly painful. Head troubled him vaguely when it did not ache hard. His stomach pained him. He had little appetite. A fourth case: had worked there one year. Eyes were sometimes so bad that they were swollen shut. He had to bathe his eyes every day, as soon as he got home, in cold water. His eyes hurt so in artificial light that he often ate his supper in an unlighted room. Even if he kept his eyes closed in a lighted room, it was so painful he could not stand it. Many days his head felt as though he were drunk.

In another building of the same company, pieces of apparatus are dipped into a wood alcohol solution of shellac. Though there are many windows in the room in which this is done, these are kept closed most of the time, even in summer, because air currents spoil the drying process.

The men working in this room reported as follows:

Case No.	Eye effects.	Head effects.	Other effects.
No. 1....	Burn and smart; so weak can only read with difficulty fifteen minutes at a time.....	Dazed and bewildered....	Skin dries and peels off hand. Has little appetite.
No. 2....	Eyes very red rimmed and swollen. Optic nerve permanently affected according to physician...	Thick feeling in head—heavy and dull.....	"My stomach is in bad shape." Indigestion and constipation.
No. 3.*..	Has only one eye and that has not been affected much.....	Dizzy.....	Fingers just healed after being opened at tips over a year. Indigestion, nausea. "If we didn't have to, no one working in this room would ever eat at all."

* This man had to stop "dipping" on account of his fingers cracking open at the tips he now works in the same room, other end.

In another building, girls are employed as "stickers." They paste mica and other insulating materials in layers. The following reports were obtained:

Case No.	Eye effects.	Head effects.	Other effects.
No. 1. . . .	Weak and burn.	None.	None.
No. 2. . . .	Burn when tired.	Headaches.	None.
No. 3. . . .	None.	Very bad headaches. Has to take medicine often.	None.
No. 4. . . .	Burn and smart.	Headaches.	None.
No. 5. . . .	Burn and smart.	Headaches.	Indigestion, so bad often has to go home.
No. 6. . . .	None.	None.	None.
No. 7. . . .	Burn and smart.	Head swims and pains.	None.

These cases have been selected as typical of a great number; thus the seven girls quoted were in a room in which two hundred and thirty were employed.

SUMMARY AND CONCLUSION

Condition of the Workers:

By a perusal of the foregoing data it will be apparent that the workers in some places where wood alcohol is used are affected with eye troubles, headaches, stomach troubles and affections of the skin.

Dangers to the Workers:

The dangers to the workers are due to exposure to the vapor of methyl alcohol and constant contact of the liquid with the skin.

Their Need of Protection:

Such being the case, adequate protection to these workers should be a legitimate demand on the part of the State.

What the Manufacturers and Chemists Can Do:

The manufacturers and chemists can lend their aid in protecting the workers in the following ways:

1. By minimizing the dangers.
2. By calling the attention of the workers to the dangers involved as follows:
 - (a) By systematic instruction;
 - (b) By the distribution of leaflets, printed instructions, etc.;

- (c) By providing ample ventilation;
- (d) By installing suction and condensing systems, or other means, for the recovery of the wood alcohol.

What the State Should Do:

The State should

1. Endeavor to get the co-operation of employer and employee in the enforcement of legitimate requirements minimizing the danger to the workers;
2. Insist on the labelling of all containers of wood alcohol so as to call attention to its poisonous nature;
3. Provide that placards in large print, in the languages of the workers, be placed in conspicuous parts of the rooms where wood alcohol is used, containing warning notices as to its poisonous nature;
4. Insist on ample ventilation. It might almost be said that practically the whole problem is capable of solution by this one provision — ample ventilation. If the use of wood alcohol is essential to the continuance of an industry and the dangers to which the workers are exposed were inherent in the use of wood alcohol, there might be some justification for the State in permitting things to remain as they are. But such is decidedly not the case. Adequate ventilation would do away with the greater part of the evils connected with the use of wood alcohol. Therefore the State should demand such ventilation.

3.

PERSONAL HISTORIES OF 132 CHEMICAL WORKERS
IN PLANTS AT NIAGARA FALLS CLASSIFIED BY
TABULAR ANALYSIS.

During the investigation of the chemical plants at Niagara Falls in August of 1912 it was deemed advisable to take the personal histories of one hundred or more workers in the chemical factories in order to determine the economic sanitary and individual health conditions under which they worked.

Mrs. Marie Sabsovich Orenstein of the Department of Labor, who was assigned to our work by Commissioner John Williams, accordingly took the histories of 132 workers in the various plants. She was assisted by Miss Grace Potter. The following history card was used:

Establishment. Night or day work.

Name. Address. Age.

Birthplace. Nationality. Married or single. Number of children.

Family here or abroad.

How many members of family work?

How long is worker in United States? How long in Niagara Falls?

Occupation in native land.

Occupation in United States previous to present job.

Name of department where now employed.

Specific character of work performed.

Number of days per week employed

Hour of beginning work each day.

Hour of stopping work each day.

Length of time for lunch. Where eaten?

Sunday work.

How many rest periods per day?

How many minutes each?

Hours of attendance in normal week.

Hours spent in actual work in normal week.

Normal week's earnings.

Estimate of earnings for year.

Estimate of earnings for year for each member of family.

Physical condition at present time.

Apparent weight. Apparent height.

General appearance.

Was he perfectly well at beginning of present work?

Record of his accidents while in this establishment.

Time lost by illness.

Nature of illness.

History of accidents previous to work in this establishment.

Does he suffer from catarrh of nose? Throat?

Does he cough? Has he inflammation of the eyes?

Does he feel any effects of his work?

Describe report.

Does he know the dangerous elements of this particular work?

Have any instructions been given to him by foreman or superintendent or anyone else in establishment?

Reason for work in this establishment.

The tables herewith presented give information in regard to the 132 workers on the following points:

1. Nationality.
2. Ages, conjugal condition and number of children of workers.
3. Number of years in the United States; number of years at present occupation, and previous occupations.
4. Weight and general appearance.
5. Physical condition at beginning of present work.
6. Hours of labor per week.
7. Earnings per week.
8. Time given for lunch and where eaten.
9. Accidents at present work; knowledge of dangerous elements, and instruction given.

NATIONALITY.

	Total number of workers.	UNITED STATES.		CANADA.		English.	German.	Italian.	POLES.		OTHERS.
		Native born.	Foreign born.	Native born.	Foreign born.				Gal.	Russian.	
Bleach house:	14	4	1	1	6	1	1	2	1	2	.....
Packers.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Floormen.....	4	2	.....	.....	.....	2	.....	.....	.....	.....	.....
Processmen.....	4	1	.....	1	.....	1	.....	.....	.....	.....	.....
Lime chargers.....	2	.....	.....	1	.....	.....	.....	.....	.....	1	.....
Lime house.....	9	4	.....	.....	2	1	1	1	.....	.....	.....
Cell house.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caustic house:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Finishers.....	4	2	.....	.....	.....	1	.....	.....	1	.....	.....
Firemen.....	2	1	.....	1	.....	.....	.....	1	2	.....	.....
Others.....	9	1	.....	.....	.....	.....	.....	6	.....	.....	.....
Muriatic acid house.....	3	.....	.....	.....	.....	1	.....	2	.....	.....	.....
Total.....	59	16	1	4	8	7	2	12	4	3	.....
Dust:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Furnace room.....	38	3	.....	.....	.....	1	.....	4	14	13	2
Crushing, mixing, packing and cleaning.....	26	2	.....	.....	.....	5	.....	8	6	5	.....
Puddling and shaving.....	4	1	.....	1	2	.....	.....	.....	.....	2	.....
Truing.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Total.....	73	8	.....	1	2	7	.....	12	20	20	2
Grand total.....	132	24	1	5	10	14	2	24	24	23	3

AGES, CONJUGAL CONDITION AND NUMBER OF CHILDREN.

	Total number.	Ages.					Single.	Married.	NUMBER OF CHILDREN.				
		16-19.	20-24.	25-34.	34-44.	45 and over.			1.	2.	3.	4.	5 and over.
Bleach house:													
Packers.....	14	.....	.....	3	9	2	.....	14	5	.....	3	2	1
Floormen.....	5	.....	.....	1	3	1	.....	5	2	.....	2	.....	.....
Processmen.....	4	.....	.....	2	2	.....	.....	4	2	.....	.....	.....	.....
Lime chargers.....	4	.....	.....	2	.....	.....	1	4	1	.....	.....	.....	1
Lime house.....	2	.....	.....	2	.....	.....	.....	2	.....	.....	1	.....	.....
Cell house.....	9	.....	3	2	1	3	4	5	1	2	.....	.....	2
Caustic house:													
Finishers.....	4	.....	.....	3	.....	1	.....	4	.....	1	1	1	1
Firemen.....	5	.....	1	1	1	2	.....	5	.....	1	2	.....	.....
Others.....	9	.....	3	3	3	.....	3	6	3	1	1	1	.....
Muriatic acid house.....	3	.....	1	1	1	.....	.....	3	.....	.....	.....	.....	.....
Total.....	59	.....	8	21	20	10	8	51	14	8	10	6	6
Dusty rooms:													
Furnace room.....	38	2	7	13	14	2	11	27	7	4	7	5	2
Crushing, mixing, packing and cleaning.	26	1	7	6	11	1	0	17	1	4	4	3	3
Puddling and shaving.....	5	.....	1	2	.....	.....	5	.....	.....	.....	.....	.....	.....
Trueing.....	4	1	.....	2	.....	1	2	2	1	.....	1	.....	.....
Total.....	73	5	15	24	25	4	27	46	9	8	12	8	5
Grand total.....	132	5	23	45	45	14	35	97	23	16	22	14	11

NUMBER OF YEARS IN UNITED STATES, OCCUPATION BEFORE IN UNITED STATES AND NUMBER OF YEARS AT PRESENT JOB.

Number of workers in each department.	NUMBER OF YEARS IN UNITED STATES.					PREVIOUS OCCUPATION.		NUMBER OF YEARS AT PRESENT WORK.							
	Under 1.	1 and under 5.	5 and under 10.	10 and under 20.	20 and over.	Similar lines.	Other lines.	Under 1.	1 and under 2.	2 and under 3.	3 and under 4.	4 and under 5.	5 and under 6.	7 and under 10.	10 and over.
Bleach house:															
Packers.....	14	...	2	5	2	8	6	...	3	2	1	1	2	2	3
Floormen.....	5	1	1	1	...	3	...	2	1	...	2	...	...	...	...
Processmen.....	4	1	...	3	...	2	1	...	...	1	2	1	...	...	...
Lime choppers.....	4	...	...	...	...	4	...	...	...	...	1	...	...	...	...
Lime house.....	2	...	2	...	...	1	...	...	...	...	...	...	...	...	...
Cell house.....	9	2	1	...	2	2	7	...	3	...	...	...	...	2	2
Gaustic house:															
Finishers.....	4	...	...	1	1	2	2	...	2	1	...	...	...	...	...
Firemen.....	5	1	1	1	...	3	2	1	1	1	...	...	...	1	...
Others.....	9	1	2	...	...	1	4	3	3	2	...	...	1	...	...
Muriatic acid.....	3*	2	...	...	...	1	2	2	1	...	...	...	...	...	...
Total.....	59	4	12	8	5	27	25	14	14	7	6	3	4	6	5
Dusty:															
Furnace room.....	38 ¹	4	21	6	1	8	12	7	5	9	8	2	3	1	2
Crushing, mixing, packing and															
Cleaning.....	26	2	4	7	3	9	12	8	1	5	3	1	6	1	1
Puddling and shaving.....	5	1	2	...	...	1	4	2	...	2	1	...	...	...	...
Truing.....	4	...	1	...	1	1	3	1	...	...	...	...	...	1	...
Total.....	73	6	27	15	5	19	31	18	7	16	12	3	10	3	3
Grand total.....	132	10	39	23	10	46	56	32	21	23	18	6	14	9	8

* One of these lives in Canada and works in Niagara Falls.

Of the 132, forty-six were in similar occupations before; 56 were in other occupations; one, unknown, and the other 29 were either too young to have any occupation or were in the United States as long as they had the present job.

¹ Number of years at present work unknown in one case.

WEIGHT AND HEALTH ACCORDING TO GENERAL APPEARANCE.

	Number workers in each depart- ment.	WEIGHT.					GENERAL APPEARANCE.						
		Under 130.	130 to 139.	140 to 149.	150 to 159.	160 to 169.	170 to 179.	Sunken chest.	Anaemia.	Burns.	Drawn face.	Others.	Good health.
Bleach house:													
Packers.....	14	.....	.....	4	6	4	.....	3	10	.....	9	.....	.....
Floormen.....	5	.....	.....	2	1	.....	.....	2	3	.....	1	.....	.....
Processmen.....	4	.....	.....	.....	2	2	.....	.....	.....	.....	.....	.....	.....
Lime choppers.....	4	.....	.....	.....	2	2	.....	.....	2	.....	.....	.....	.....
Lime house.....	2	.....	.....	1	.....	1	.....	.....	2	1	.....	.....	.....
Cell house.....	9	.....	2	.....	1	3	.....	2	6	.....	3	.....	.....
Caustic house:													
Finishers.....	4	.....	.....	2	2	.....	.....	.....	2	.....	2	.....	.....
Firemen.....	5	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Others.....	9	.....	.....	1	3	4	.....	1	4	4	2	.....	.....
Muriatic acid house.....	3	1	.....	.....	2	.....	.....	1	.....	.....	2	3	.....
Total.....	55	2	3	10	21	16	7	9	29	6	19	3	18
Dusty rooms:													
Furnace room.....	38	.....	3	11	8	9	7	10	12	1	16	.....	12
Crushing, mixing, packing and cleaning.....	26*	2	3	8	5	4	3	9	4	.....	1	.....	15
Puddling and shaving.....	5	1	1	1	2	.....	.....	2	4	.....	1	.....	.....
Truing.....	4	.....	1	.....	1	2	.....	2	3	.....	1	.....	.....
Total.....	73	3	8	20	16	15	10	23	23	1	19	.....	27
Grand total.....	132	5	11	30	37	31	17	32	52	7	38	3	45

* One weight not specified for one.

PHYSICAL CONDITION AT BEGINNING OF PRESENT WORK AND AT PRESENT.

	Number workers in each depart- ment.	WELL AT BEGINNING OF PRESENT JOB.		COMPLAIN OF —										Other effects.	Head- ache.	Thirst.	Drowsy.	Eyes.	Cough.	Throat.	Nose.	Yes.	No.	Good health.
		Yes.	No.																					
Bleach house:																								
Packers.....	14	11	3	4	13	4	4	9	4	4	4	4	3	3	2	4	9	4	13	5	1	11	3	.....
Floormen.....	5	2	3	4	4	4	1	1	1	1	1	1	3	3	2	1	1	1	1	1	1	1	2	.....
Processmen.....	4	3	1	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lime chargers.....	4	4	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lime house.....	2	2	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cell house.....	9	8	1	2	8	2	2	3	2	2	2	2	2	2	1	1	3	2	1	2	1	1	2	.....
Caustic house:																								
Finishers.....	4	4	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fitters.....	5	5	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Others.....	9	9	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Muriatic acid.....	3	2	1	3	3	3	3	1	2	2	2	2	2	2	2	2	1	2	3	2	2	1	2	.....
Total.....	59	50	9	14	37	14	13	6	13	14	13	13	14	11	5	5	13	14	37	13	13	5	16	.....
Dusty rooms:																								
Furnace room.....	38	34	4	13	24	13	13	9	.....	13	13	11	13	13	7	.....	.....	13	24	13	13	.....	.....	.....
Crushing, mixing, packing and cleaning.....	26	24	2	10	16	11	11	.....	.....	11	11	16	4	7	1	.....	.....	4	16	10	10	.....	.....	.....
Puddling and shaving.....	5	3	2	2	3	2	2	.....	.....	2	2	2	3	.....	.....	.....	.....	.....	3	2	2	.....	.....	.....
Truing.....	4	3	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	73	63	10	26	43	26	27	9	.....	26	26	43	20	20	9	.....	.....	20	43	27	27	10	19	.....
Grand total.....	132	113	19	40	80	40	40	15	13	40	40	40	34	31	14	5	13	34	80	40	40	19	35	.....

HOURS PER WEEK.

	Number of workers in each department.	NUMBER OF HOURS PER WEEK, 1 SHIFT. ¹						
		40	48-52	58	60	66-72	2 shifts.	3 shifts.
Bleach house:								
Packers.....	14	2	12	....	5	....	....	....
Floormen.....	4	....	....	....	....	....	3	1
Processmen.....	4	....	2	....	1 ²	1	....	....
Lime chargers.....	2	....	....	....	....	2	....	....
Lime house.....	9	....	2	....	1	....	1	5
Cell house.....	9	....	....	....	....	....	....	....
Caustic house:								
Finishers.....	4	....	....	....	....	....	4	....
Firemen.....	5	....	....	....	....	....	3	2
Others.....	9	....	1	....	4 ³	....	4	....
Muriatic acid house.....	3	....	....	....	1	....	....	2
Total.....	59	2	17	....	12	3	15	10
Dusty rooms:								
Furnace room.....	38	....	....	....	11 ⁴	....	4	23
Crushing, mixing, pack- ing and cleaning.....	26	....	....	2	16 ⁵	2	3	3
Puddling and shaving....	5	....	....	5	....	....	....	....
Trueing.....	4	....	....	4	....	....	....	....
Total.....	73	....	....	11	27	2	7	26
Grand total.....	132	2	17	11	39	5	22	36

¹ For the one shift the number of hours is given exclusive of Sundays.² Works one Sunday a month.³ 2 work every Sunday and 2—once in two weeks.⁴ 8 worked on Sunday; one worked one Sunday a month; one—every Sunday and six—once in two weeks.⁵ 2—every Sunday and 3—once in two weeks.

EARNINGS PER WEEK.

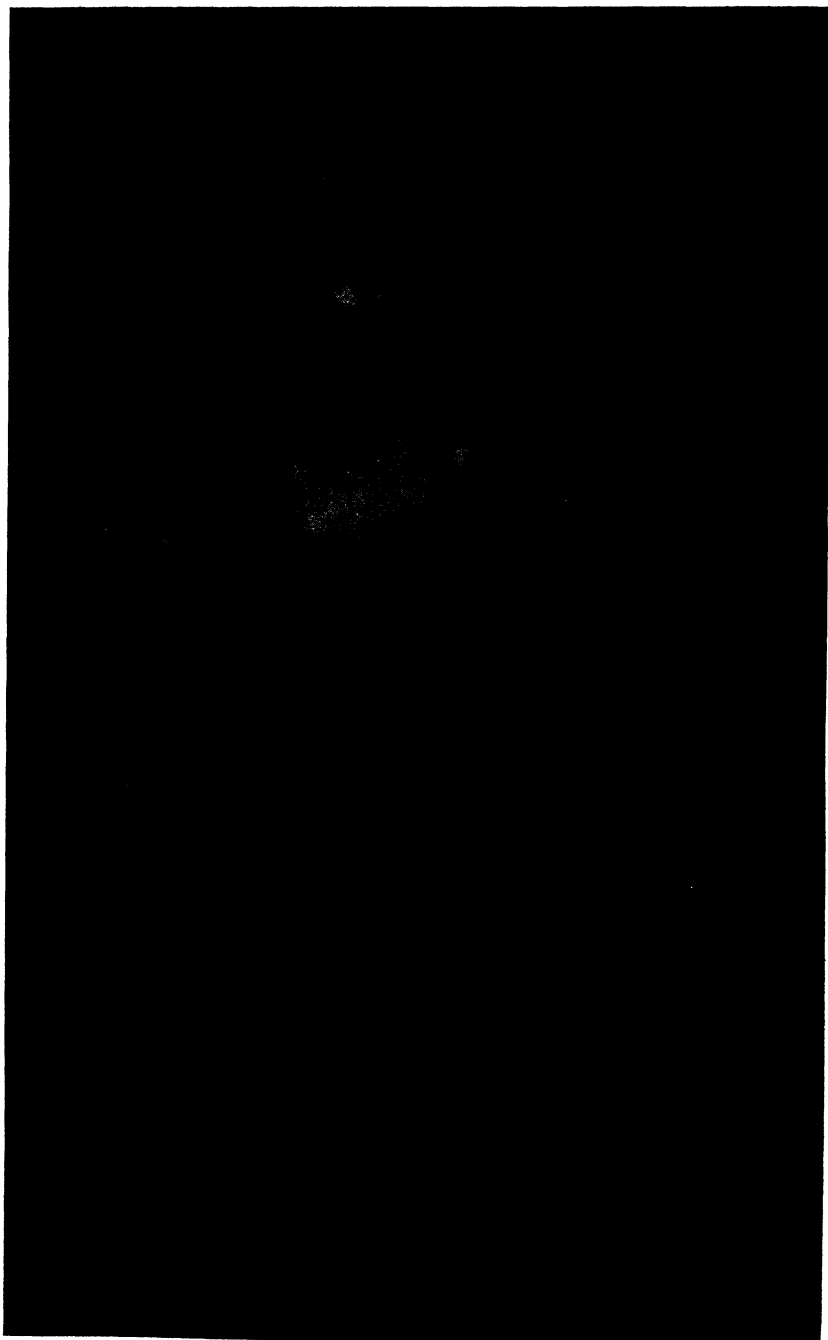
	Number of workers in each department.	EARNINGS PER WEEK (IN DOLLARS).									
		10.00 to 10.99.	11.00 to 11.99.	12.00 to 12.99.	\$ 13.00 to \$ 13.99.	14.00 to 14.99.	15.00 to 15.99.	16.00 to 16.99.	18.00 to 19.99.	20.00 to 21.99.	22.00 to 25.00.
Bleach house:											
Packers.....	14			2			3			3	11
Floormen.....	5						1		3		
Pressmen.....	4								2		
Lime chargers.....	4			1						2	
Lime house.....	2				2	7					1
Cell house.....	9										
Caulstle house:											
Finishers.....	4				1	1			4	3	
Firamen.....	5				1	1			1		
Others.....	9			3	1		3				
Muriatic acid house.....	3						2				
Total.....	59			6	5	9	9		13	5	12
Dusty rooms:											
Furnace room.....	38		7	11	2	3	9	2	4		
Grinding, mixing, packing and cleaning.....	26	3	5	7	4	2		2	3		
Pudding and shaving.....	5	1	1	1		1		1			
Truing.....	4				2				1		
Total.....	73	4	13	19	8	7	9	5	8		
Grand total.....	132	4	13	25	13	16	18	5	21	5	12

LUNCH.

	Number of workers in each department.	TIME GIVEN FOR LUNCH.			WHERE EATEN.	
		30 minutes.	45 minutes.	Irregular.	Shop.	Elsewhere.
Bleach house:						
Packers.....	14	14	.....	.....	.....	14
Floormen.....	5	1	.....	4	2	3
Processmen.....	4	3	.....	1	.....	4
Lime chargers.....	4	4	.....	.....	1	3
Lime house.....	2	1	.....	1	2	.....
Cell house.....	9	1	2	6	8	1
Caustic house:						
Finishers.....	4	1	.....	3	4	.....
Firemen.....	5	3	.....	2	4	1
Others.....	9	9	.....	.....	9	.....
Muriatic acid house.....	3	1	.....	2	.....	3
Total.....	59	38	2	19	30	29
Dusty rooms:						
Furnace room.....	38	11	5	22	14	24
Crushing, mixing, packing and cleaning.....	26	16	5	5	4	22
Puddling and shaving.....	5	.....	5	.....	4	1
Truing.....	4	.....	4	.....	2	2
Total.....	73	27	19	27	24	49
Grand total.....	132	65	21	46	54	78

ACCIDENTS AT PRESENT WORK. KNOWLEDGE OF DANGEROUS ELEMENTS AND INSTRUCTION GIVEN.

	Number of workers in each department.	Had Accidents.	Had no Accidents.	Knowledge of Dangerous Elements.	Instruction given.
Bleach house:					
Packers.....	14	1	13	11	11
Floormen.....	5	.....	5	5	3
Processmen.....	4	.....	4	3	3
Lime chargers.....	4	1	3	4	4
Lime house.....	2	.....	2	.....	.....
Cell house.....	9	2	7	7	5
Caustic house:					
Finishers.....	4	2	2	4	3
Firemen.....	5	.....	5	2	2
Others.....	9	4	5	8	6
Muriatic acid house.....	3	.....	3	2	.....
Total.....	59	10	49	46	37
Dusty rooms:					
Furnace room.....	38	11	27	25	19
Crushing, mixing, packing and cleaning.....	26	4	22	12	6
Puddling and shaving.....	5	.....	5	2	.....
Truing.....	4	1	3	2	.....
Total.....	73	16	57	41	25
Grand total.....	132	26	106	87	62



PLANT P, NIAGARA FALLS, N. Y.

Man with nose stuffed with cotton to keep out the dust from bichromate
of potash.

4.

FORTY ACCIDENTS OCCURRING IN PLANTS AT
NIAGARA FALLS.

INVESTIGATOR, MISS GRACE POTTER.

1.

Accident: Inhaling chlorine gas; fatal.*Name:* O. H——.*Nationality:* American.*Age:* Forty-one.*Married or single:* Married. Three children.*Date of accident:* January 22, 1911.*Establishment:* Plant B.*Specific work:* Carrier for the chlorine chamber.*Date of investigation:* July 25, 1912.*Medical attention:* Dr. E. G——.

Statement of case: Escaping chlorine gas was inhaled and caused unconsciousness. O. H—— was found unconscious at five o'clock in the afternoon; he was taken out and laid in the snow, and as that did not revive him ether was given to counteract the effects of the chlorine gas. Then the man was walked home in the severe cold in the hope that he would recover both from chlorine gas and ether. No doctor was called by the company to attend him when overcome with gas nor to help him recover from the effects of the ether. The family called a physician after the man was brought home. He died from bronchial pneumonia a week after he had inhaled the gas. *Statement of wife:* "Before he died my husband told me how the accident occurred. He said a fellow-worker had left open a slide in the chlorine gas chamber and he smelled the escaping gas. As there were few people around, it being Sunday afternoon, my husband went into the chamber by himself, found the slide that was open and closed it. He came out and that was all he could remember. He fell unconscious and was found a half hour or so afterwards by fellow-workmen. They called no doctor but laid him in the snow. Then they brought him in and gave him ether. Fearing that he would not regain consciousness they took him home, making him walk

all the way. I wanted to know why they did not bring him home in a carriage or telephone to me to send a carriage. They said they were afraid to let him ride, they must keep him active. It was 10:30 o'clock at night when they got him home. We called a doctor for him and four days after he came home he was a maniac. It required three men to hold him in his delirium. The doctor advised that intravenous injections of saline solution be given after taking his blood out. When the blood was pumped out the odor of chlorine gas in it was distinct; the trained nurse pointed this out to me. The Sunday after he inhaled the gas he died. The company sent no word of any kind to me, and after waiting to hear from them I wrote asking what they were going to do. They settled October 14th through my lawyer, granting me \$500. I am now nursing to support myself and three children." *Statement of Physician*: "I attended this man in the illness which resulted in his death. It is true that his sickness was caused by the accident at the factory and the treatment which followed it before a physician was called."

2.

Accident: Burns from caustic.

Name: C. M——.

Nationality: American.

Age: Forty-eight.

Married or single: Married. One child.

Date of accident: June 16, 1912.

Establishment: Plant B.

Specific work: Packer of caustic.

Medical attention: Dr. H. A——.

Statement of case: C. M—— worked five years at Plant B as a packer of caustic, making from \$20 a week up. His hours were from 7 a. m. to 4.30 p. m. The day upon which the accident occurred a fellow-worker asked C. M—— to take charge of the caustic chute as his wife was sick and he wished to visit her in the hospital. C. M—— was familiar with this chute as he had tended it formerly himself. Two folds of cotton were over the bottom of the chute and the caustic, caught between the two folds, fell on his leg and foot. The man was home for a week under

the doctor's care. Then, though he was suffering intense pain, he went back to try to work. He stayed for about three weeks at his old work and then left to go to the Hydraulic Car Company as a stone mason. *Present condition*: Late in August, 1912, still suffering from burns. *Statement of patient*: His doctor's bill was not paid by the company nor was anything allowed on his wages while he stayed home.

3.

Accident: Burned with alkali.

Name: I. T——.

Nationality: Irish.

Age: Thirty-six.

Married or single: Single.

Date of accident: July 16, 1912.

Establishment: Plant B.

Specific work: Laborer.

Date of investigation: July 30, 1912.

Medical attention: Dr. J. E——.

Statement of case: I. T—— has been in the United States six years. Had worked in Plant B five years. His hand was burned with alkali in July so that he was unable to work for two weeks. *Statement of Patient*: "I hurt my hand on the steel drum and the next day burned it with alkali. It was the burning of alkali that hurt me and made it impossible for me to work." *Statement of physician*: "The man injured his hand by burning it with alkali, but that was not what made it so painful and necessitated his leaving work. His hand became infected with dirt after it was burned and that caused him to be laid up."

4.

Accident: Burns from hot lead.

Name: A. W——.

Nationality: Irish.

Age: Thirty-one.

Married or Single: Married. Two children.

Date of accident: August 8, 1911.

Establishment: Plant C.

Specific work: Moulder's helper.

Medical attention: Dr. I. W——.

Statement of case: A. W—— had been two days in the employ of Plant C when a moulder poured water on a mould to cool it, while the mould was open. Then the mould was closed and the untrapped water, which might have been in excess, was converted into steam driving lead into the pump, submerged in the lead pot. This caused the lead to blow up in a shower from the pot. The moulder's helper, in order to avoid the rising shower from hitting him in the face, "leaded back," thus opening the waist of his trousers, when the molten lead, descending, fell on his body and legs. The physician who was called to dress the burns ordered the man to be sent to E—— Hospital. He was there seven days, and then went home. He never returned to work at Plant C.

5.

Accident: Burned with hot lead.

Name: A. H——.

Nationality: American.

Age: Forty-one.

Married or single: Married. One child.

Establishment: Plant C.

Specific work: Moulder in a foundry.

Medical attention: Dr. A. R——.

Statement of case: A. H—— worked for two weeks at Plant C as a moulder in the foundry building, when lead spattered from a nearby pot near where he was working and burned him. No treatment was given him at that time, but on September 2, 1911, the burn having become infected, the physician was called and treated him. He did not return to work. No further history of the man was obtainable.

6.

Accident: Hand crushed.

Name: D. J——.

Nationality: American.

Age: Thirty-five.

Married or single: Married. Two children.

Date of accident: April 15, 1912.

Establishment: Plant C.

Specific work: Mill hand.

Medical attention: Dr. A. R——.

Statement of case: D. J—— had worked eight months as mill hand in Plant C. As he was shearing lead his glove caught in the rolls and his right hand was badly crushed. He was treated by Dr. A. R——.

7.

Accident: Fractured skull and other injuries.

Name: A. G——.

Nationality: American.

Age: Eighteen.

Married or single: Single.

Date of accident: November 23, 1910.

Establishment: Plant F.

Specific work: Crane operator.

Medical attention: Dr. O. W——.

Statement of case: A. G—— was greasing the crane in the factory and started down with the cab, putting one foot on the side of the cab and the other one on the floor. His foot stuck and he fell, injuring himself severely. He was taken to E—— Hospital. *Statement of physician:* A. G—— had a fractured skull, his left wrist was fractured, left arm lacerated, and he had a Colles fracture of left arm. He was in the hospital three weeks.

8.

Accident: Injured by electric shock; fatal.

Name: P. R——.

Nationality: American.

Age: Twenty.

Married or single: Single.

Date of accident: December 14, 1910.

Establishment: Plant F.

Work: Electrician's helper.

Date of investigation: July 28, 1912.

Medical attention: Dr. O. W——.

Statement of case: P. R—— had worked at Plant F five months. He was trying to fill a water rheostat before the feeder

switch had been thrown out, when he was instantly killed by coming in contact with 11,000 volt current, according to the records of the company. The death certificate reads that he received an electric shock from 12,000 volt current. The coroner's verdict censured the foreman of Plant F.

9.

Accident: Injured in machinery; fatal.

Name: O. A——.

Nationality: Polish.

Age: Nineteen.

Married or single: Single.

Date of accident: July 30, 1912.

Establishment: Plant F.

Work: Laborer.

Date of investigation: July 30, 1912.

Medical attention: Dr. T. G——.

Statement of case: O. A—— had been working in Plant F for several months. In trying to put a belt on a wheel while the shaft was turning, he used a $\frac{7}{8}$ -inch board. The board was thrown back violently, hitting him in the abdomen. He was taken to the E—— Hospital, where he died August 2, 1912. On the death certificate which accompanies this case the name of the doctor who attended the boy does not occur, nor is there any reference to the fact that he died a violent death. The city clerk when asked for the death certificate had difficulty in finding it. It was filed under a name different from that given at the factory or hospital. The cause of death is given as peritonitis, with no indication that death was the result of an industrial accident. The assistant coroner, who issued the certificate, held no autopsy. The inquest was arranged for but delayed from time to time, and when the investigation was closed August 15, 1912, no inquest had yet been held. *Statement of Physician:* "This boy's intestines were ruptured." *Statement of foreman:* "I saw O. A—— trying to put a belt on the shaft. He used a big board, which hit him in the stomach. He got up and walked over to the window, and we asked him if he was hurt very much. He kept holding his hand over his stomach, but he said he thought he

could walk. He walked to the room in the factory where surgical aid is given, which was some distance from the room in which he was injured."

10.

Accident: Burned face and neck.

Name: A. J——.

Nationality: Italian.

Age: Thirty-five.

Married or single: Single.

Date of accident: February 20, 1912.

Establishment: Plant F.

Work: Pit-man.

Date of investigation: July 28, 1912.

Medical attention: Dr. H. A——.

Statement of case: A. J—— had worked one year and eleven months at Plant F, making \$12.88 a week. He was sweeping floor back of furnace, one of his regular duties, when carbide blew out, burning his face and neck. *Statement of physician:* "I attended this man after he had been burned. He was disabled for two weeks."

11.

Accident: Injured by machinery; fatal.

Name: I. R——.

Nationality: Canadian.

Age: Forty-six.

Married or single: Married. Two children.

Date of accident: March 21, 1912.

Establishment: Plant F.

Work: Millwright.

Date of investigation: July 31, 1912.

Medical attention: Dr. H. A——.

Statement of case: While I. R—— was in the mill room repairing a shaft at Plant F, his clothes were caught in a sprocket on a line shaft. He was whirled about the shaft and badly mangled, both legs and one arm being broken. He was taken to the E—— Hospital, where he died March 24, 1912, of the shock following the accident. *Statement of fellow-workman:* "He was caught in

a screw which was projecting, when it should have been set in or protected. This screw caught his undershirt. The accident need not have happened if the company would only keep things to protect the workers from obvious dangers."

12.

Accident: Cut on eye.

Name: E. T——.

Nationality: Italian.

Age: Thirty-two.

Married or single: Married.

Establishment: Plant F.

Work: Laborer.

Medical attention: Dr. I. W——.

Statement of case: E. T—— was working on drum with hammer and chisel, cutting off nuts, when piece struck his eye. The physician was called to attend him and he was taken to the E—— Hospital, where a diagnosis of traumatic iritis was made. *Statement of fellow-worker:* "I was working about twelve feet from E. T—— the day on which he had his eye hurt. I was tamping coke in the oven of an electrode at the time, and he was cutting a nut off a drum known as a thousand-power drum. I did not see him get hurt, but he called to me and told me his eye was hurt. I asked him how it had happened. He said he was working with a hammer and chisel, cutting a nut off the corner of a drum, and that something flew up and struck him in the eye."

13.

Accident: Burned by hot carbide.

Name: C. H——.

Nationality: American.

Age: Forty-eight.

Married or single: Married.

Establishment: Plant F.

Work: Furnace man.

Date of investigation: July 30, 1912.

Medical attention: Dr. H. A——.



PLANT R, NIAGARA FALLS, N. Y.
Caustic "breaker," whose daily work exposes him to caustic burns, slow
and painful in healing.



Statement of case: C. H—— had worked six months at Plant F for \$15.68 a week. Two carbons broke in an electrode of the furnace and falling into the hot carbide caused it to fly onto the platform where C. H—— was working. It hit him on the face, eyes and right hand. The physician was called and he was taken to the E—— Hospital. *Statement of physician:* "C. H—— was disabled for two weeks on account of injuries due to accidental burning."

14.

Accident: Overcome with gas.

Name: M. G——.

Nationality: American.

Age: Forty.

Married or single: Married. One child.

Establishment: Plant F.

Work: Foreman.

Medical attention: Attendant from the hospital room of company.

Statement of case: M. G.—— had worked at Plant F. for 5 years, 4 years as a foreman for \$21.00 a week, 8 hours a day. *Statement of patient:* "One morning acetylene gas was escaping from somewhere, and several of us were looking for the leak. I was working over a manhole in a tube, when I discovered that the conveyor was broken. I started to put in new bolts when I suddenly felt dizzy. I went away from the hole saying I was sick. In a moment more I had become partially delirious. I knew where I was but I felt 'crazy' for an hour or two. The other workmen took my arms and walked me about to keep me active until the effects of the gas should be walked off. For a whole week after that I did not feel like myself. I could not eat. The gas is always escaping more or less at this factory and we get the effects of it somewhat all the time. It makes me cranky home so that I don't want to speak to anybody when I come into the house." *Present condition:* M. G.—— is not very strong. Frequently throws up his food and is very irritable.

Note: A special attendant at the factory looked after this man. No doctor was called at the time of the accident.

15.

Accident: Broken leg and burns.

Name: A. A——.

Nationality: Polish.

Age: Twenty-seven.

Married or single: Single.

Date of accident: February 6, 1912.

Establishment: Plant F.

Work: Furnace man, etc.

Medical attention: Dr. H. A——.

Statement of case: An explosion took place at Plant F. and A. A—— was badly injured. He was sent to the E—— Hospital.

Statement of physician: "I found that A. A—— had a compound fracture of both bones of the right leg, and his left eye was burned. He was in the hospital 14 weeks, leaving for home April 30, 1912."

16.

Accident: Carbon monoxide gas caused death.

Name: A. J——.

Nationality: English.

Age: Thirty-one.

Married or single: Single.

Date of accident: March 17, 1911.

Establishment: Plant F.

Work: Carpenter.

Medical attention: Dr. I. W——.

Statement of case: A. J—— was born in England. Had come to this country to better his condition as he was helping to care for aged parents, brothers and sisters. He was putting a wooden form around a pipe carrying carbon monoxide gas, near the ceiling. This pipe had been installed a day before. Had two valves in it. Apparently there was a discharge of gas around one of the valves which as a rule tighten themselves up in from twelve to twenty hours. While working the man fell unconscious off the ladder. *Statement of physician:* "This man had goitre and was therefore more susceptible than another one would have been to the gas." *Coroner's verdict:* "A. J—— came to his death at

Plant F., March 17, 1911, as the result of inhaling carbon monoxide gas, which was escaping from a leaking valve or gate, in a gas pipe, near which he was repairing the floor. From the evidence it appears that A. J—— was suffering from goitre which made him more susceptible to the effects of the gas. The fact that the gas was leaking, was known to the superintendent of Plant F. before the accident; and furthermore, it appears to the coroner that sufficient care was not exercised by the employers of the company in investigating the extent of the leak and determining the safety of the conditions before sending the man to this point to work. This man who was killed had been sent to repair the floor over a large valve in a dust clogged pipe from the furnace gas system." *Statement of fellow-worker*: "This valve was leaking gas unknown to the deceased or foreman in charge. He was probably overcome by gas and fell to the floor where he was found later by two workmen."

17.

Accident: Finger maimed.

Name: T. J——.

Nationality: American.

Age: Thirty-two.

Married or single: Married.

Establishment: Plant F.

Date of accident: June 22, 1912.

Medical attention: Dr. I. W——.

Statement of case: In the regular performance of his work, T. J—— injured his finger so that it had to be amputated, part of its length. The physician attended him at E—— Hospital for the operation.

18.

Accident: Arm and leg burnt.

Name: O. S——.

Nationality: Italian.

Age: Twenty-five.

Married or single: Married.

Establishment: Plant F.

Work: Laborer.

Medical attention: Dr. I. W——.

Statement of Case: O. S—— burned his arms and leg. Was sent to the E—— Hospital. He was disabled for three weeks.

19.

Accident: Left arm crushed.

Name: I. M——.

Nationality: Polish.

Age: Sixteen.

Married or single: Single.

Establishment: Plant F.

Work: Laborer.

Date of accident: January 16, 1912.

Medical attention: Dr. I. W——.

Statement of case: Was left an orphan with young sisters to care for, and went to work at Plant F. I. M—— had been working several months, when, in the regular performance of his duties, an accident occurred which caused his left arm to be crushed. The physician sent him to the E—— Hospital where he remained nine weeks. His arm had to be amputated at the elbow. The boy, though small and undeveloped, is now in fairly good health. In September, 1912, he was awarded \$2,000 on a suit against the company. He had sued for \$30,000. *Statement of physician:* "Yes, I attended the little fellow. I believe he did have his arm amputated. I would not say that the company he worked for ought to give him any money for it." *Statement of boy:* "I had to go to work to take care of my little sisters, and how was I to know how to protect myself from getting my arm hurt? Now it is gone and I can never work like a man could."

20.

Accident: Burned by explosion of hot carbide.

Name: R. T——.

Nationality: American.

Age: Forty-one.

Married or single: Married. Five children.



PLANT F, NIAGARA FALLS, N. Y.
Dusty mill worker cleaning his clothes with compressed air pump.

11900

Establishment: Plant F.

Work: Furnace man.

Date of investigation: July 31, 1912.

Date of accident: July 9, 1912.

Medical attention: Dr. H. A——.

Statement of case: R. T—— had worked for one year and four months in the furnace department at \$2.40 per day; seven days a week. On the day of the accident he was tapping the furnace as usual and put an iron bar into the tap hole to make the carbide run, when an explosion occurred throwing carbide over the ankle of his right leg. *Statement of physician:* "I treated R. T—— for burns. He was disabled for three weeks."

21.

Accident: Electric shock, fatal.

Name: M. C——.

Nationality: American.

Age: Twenty-nine.

Married or single: Married.

Date of accident: August 28, 1911.

Establishment: Plant G.

Work: Laborer.

Medical attention: Dr. I. W——.

Statement of case: M. C—— was in the "brine" pit, with two other workers, holding a long extension electric light with a cage around the globe, so that they could see to connect pipes. An hour before he was killed, he spoke to his fellow-workmen of feeling an electric shock. He suddenly fell down, and, as the pit was covered with a brine six and one-half inches deep, his head was under the brine a moment before he was picked up. He gasped as they took him out of the pit and died before the physician reached him. Death certificate submitted. *Statement of physician:* "There were found two small scalp wounds, a burn about the size of a dollar on the left shoulder, and a burn the size of a nickel on the right arm. The burn on the right shoulder looked like a burn from electricity and that on the left shoulder like a caustic burn." *Coroner's verdict:* "Death from electric shock, following contact with 110 volt current."

22.

Accident: Internal hemorrhage and ruptured spleen, fatal.

Name: O. S——.

Nationality: Russian.

Age: Twenty-four.

Married or single: Single.

Date of accident: February 22, 1911.

Establishment: Plant G.

Work: Laborer.

Medical attention: Dr. O. E——.

Statement of case: O. S—— was injured as he was adjusting the wash nozzle of a pipe in a circular basket five feet in diameter outlined by a screen and an iron guard. He reached in with a cast-iron pipe about six feet long, to make the adjustment while the machine was running. The pipe slipped off the nozzle and hit the screen, bounded back and hit the man in the stomach. He was taken to the E—— Hospital where he died several hours later. Death certificate submitted. *Man's ante-mortem statement:* "I had to use the pipe in the way I did, as it was customary to do so." *Statement of physician:* "O. S—— died of ruptured spleen and internal hemorrhage, resulting from the blow."

23.

Accident: Back and ribs broken; fatal.

Name: U. J——.

Nationality: Polish.

Age: Thirty-eight

Married or single: Married. Three children.

Date of accident: July 16, 1912.

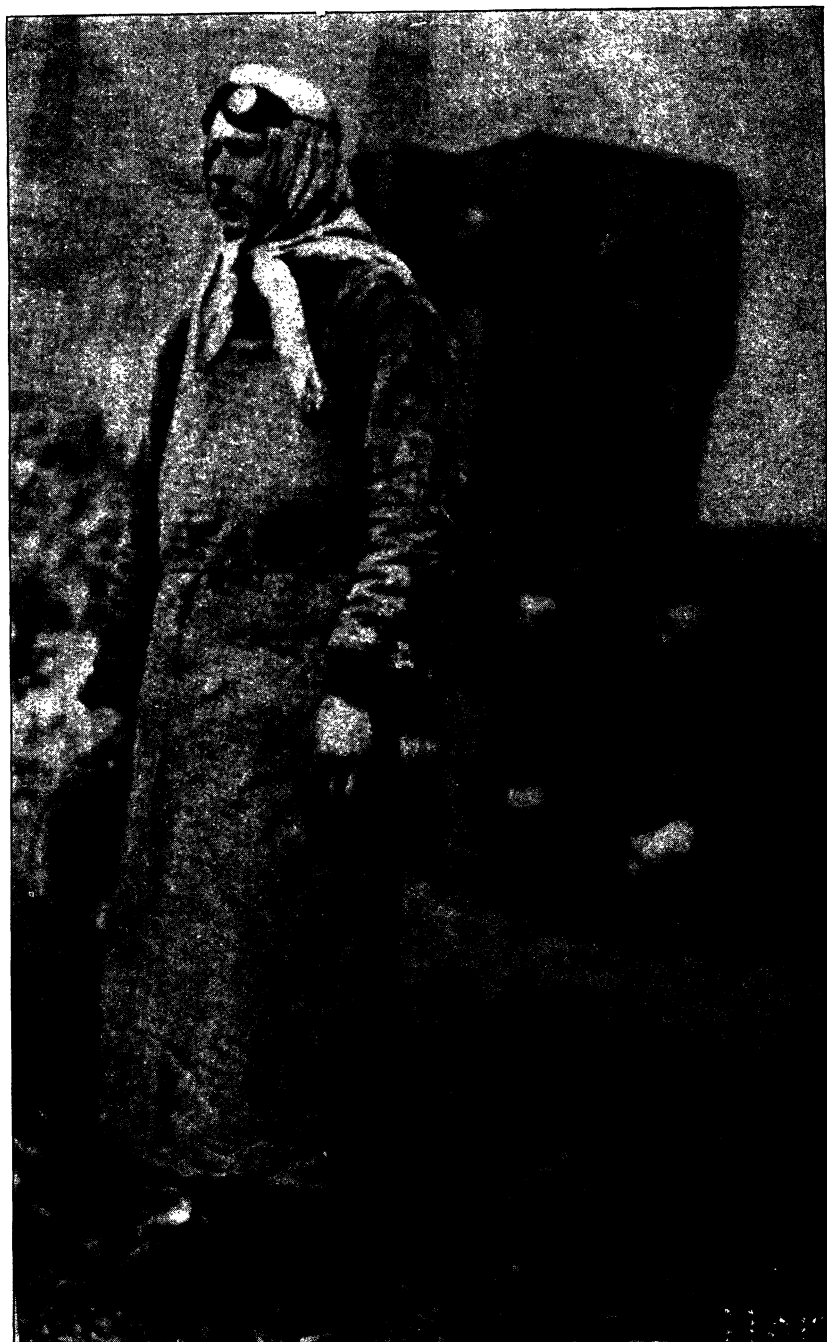
Establishment: Plant G.

Work: Laborer.

Date of investigation: July 30, 1912.

Medical attention: Dr. I. W——.

Statement of case: U. J—— had been in the United States only nine weeks when the accident occurred. He understood no English. He was helping two other workmen to pile up bags of cement, and was injured by their falling on him and two others.



PLANT R, NIAGARA FALLS, N. Y.

Breaker of caustic, which, flying up in small particles, burns his face.— For protection he wears over his head an old kitchen apron brought from home.

1701

His back and ribs were broken. He was taken to the E—— Hospital. *Statement of physician:* “U. J—— has a chance to live but he will be partially paralyzed.”

Note: U. J—— died August 30, 1912.

24.

Accident: Leg broken and arm bruised.

Name: E. J——.

Nationality: Polish.

Age: Forty-five.

Married or single: Married.

Date of accident: July 16, 1912.

Establishment: Plant G.

Work: Laborer.

Date of investigation: July 30, 1912.

Medical attention: Dr. I. W——.

Statement of case: E. J—— was piling bags of cement in the yard of Plant G. A number of them fell, crushing him and two others. His leg was broken and his arm bruised. He was taken to the E—— Hospital. *Statement of physician:* “I attended this man and cared for his injuries.”

25.

Accident: Gash in forehead.

Name: L. W——.

Age: Thirty-eight.

Date of accident: July 31, 1912.

Establishment: Plant H.

Work: Worker on abrasive wheel.

Medical attention: Dr. O. W——.

Statement of case: L. W——, working on a twenty-inch carborundum wheel, cutting an eight-inch carbon, was struck with a piece of the wheel which broke, hitting him between the eyes. He was incapacitated for two days. *Present condition:* Recovered; at work. *Statement of physician:* “I attended this man.”

26.

Accident: Fall, hurting side.

Name: Y. S——.

Nationality: Polish.

Age: Thirty-nine.

Married or single: Married. Six children.

Date of accident: August 15, 1911.

Establishment: Plant J.

Work: Furnace man.

Medical attention: Dr. O. A——.

Statement of case: Y. S—— had worked two years at Plant J. Came here from the old country because he wanted to get more pay to properly provide for his children, and he wanted them to have a better education than they could get in Poland. He makes \$16.97 a week, working in night shift usually. His hours were from 5.45 p. m. to 6.45 a. m. Y. S——, while taking a quantity of aloxite down in an elevator, which consisted of a platform with no sides or guards, his foot slipped and he had to catch hold of the sides of the wall to keep from falling. By the time he had balanced himself the elevator was several feet below him and he had to drop eight or nine feet. The fall injured his elbow and right side. He was home for three weeks unable to work. As soon as he could, he got work elsewhere but does not want to give name of factory. *Statement of patient:* "My fall was due to the elevator being such a cheap affair that it gave no protection to the poor devils who had to ride in it." *Statement of physician:* "I treated this man for injuries due to a fall."

27.

Accident: Inflamed eyes.

Name: N. J——.

Nationality: Norwegian.

Age: Thirty-three.

Married or single: Single.

Date of accident: July 25, 1912.

Establishment: Plant J.

Work: Carpenter.

Medical attention: Superintendent of factory and clerk at drug store.

Statement of case: While doing construction work at Plant J, this man suffered from extreme inflammation of the eyes. His

foreman took him to the superintendent who gave him a prescription to get filled at the drug store, telling him that was better than going to a doctor. *Present condition:* Eyes still painful and swollen. *Statement of patient:* "I had been working several days at this construction work when there came some very hot weather and the sun shone very brightly. My eyes began to hurt me so bad I could not stand it. Other workmen said it was the glare of the sun on the lime-soaked earth, which together with the chlorine gas, caused my eyes to burn. I had to tell my foreman because they were so bad. The foreman took me to the superintendent of the factory and he sent me to the drug store with a prescription to be filled. I got it and it helped my eyes. But it was ten days before the pain stopped and I could see well."

28.

Accident: Inflammation of eyes.

Name: U. J——.

Nationality: Polish.

Age: Thirty.

Establishment: Plant J.

Work: Sifting coke.

Medical attention: None.

Statement of case: U. J—— had worked five years at Plant J, in the grinding and sifting room. His eyes are constantly inflamed and smarting from the dust at the plant. *Present condition:* Eyes red and watering. Coughs frequently. Troubled with indigestion.

29.

Accident: Drawn between rolls of paper, fatal.

Name: U. J——.

Nationality: Russian.

Age: Twenty-four.

Married or single: Single.

Date of accident: November 5, 1910.

Establishment: Plant M.

Work: Paper worker.

Medical attention: Dr C. W——.

Statement of case: The man was drawn between two rolls of paper and was taken out dead. Death certificate submitted. *Statement of fellow-worker:* "U. J—— tried to stop a reel by his hand and was drawn in between two rolls of paper. When I came back this man was in a roll. He was about one and a half or two feet from the back end. His hand and one arm were sticking through the rolls. He had no business to put his hand in there unless it was to stop it quick himself." *Statement of physician:* "This man died from crushed skull and dislocated neck."

30

Accident: Fall from ladder; fatal.

Name: R. O——.

Nationality: Canadian.

Age: Forty-two.

Married or single: Married.

Date of accident: November 18, 1910.

Establishment: Plant N——.

Work: Millwright.

Medical attention: Coroner, Dr. C. W——.

Statement of case: At Plant N, R. O—— was going up a ladder with his tools in one hand. He fell, striking a light blow on the shoulder of the man just behind on the ladder. He landed on his stomach and face. When he was picked up he was dead. *Statement of fellow-worker:* "The ladder from which this man fell was one in common use. Many of the men carry their tools up and down each day. They could be taken up with a rope after a man had climbed the ladder, but no one ever does it. *Coroner's verdict:* Accidental death. Death certificate submitted.

31

Accident: Drawn between two rolls of paper; fatal.

Name: A. I——.

Nationality: Hungarian.

Age: Thirty.

Married or single: Single.

Date of accident: October 23, 1910.



PLANT F, NIAGARA FALLS, N. Y.
Grinding machine man (indoors).



Establishment: Plant O——.

Work: Papermaker.

Medical attention: Dr. O. E——.

Statement of case: This man had worked about two and one-half years at the mill, and it was testified by his foreman at the inquest that he was fairly familiar with work and had often done it before. When the accident occurred A. I—— was putting paper over a roll as fast as it was passed to him by a fellow-worker. There was a distance of three or four inches between two rolls running in different directions. A. I—— was caught between these two rolls and was dead when taken out. *Statement of fellow-worker:* "I am employed as a papermaker at Plant O——, and was present on the morning of October 23, 1910, when the accident in which A. I—— was killed occurred. I was on the opposite side of the rolls from where he went in. We were working together when the paper broke between the rolls and the calendars. I handed it over to him and he took it out of my hands and was supposed to pass it around so that I could reach it again on the opposite side of the roll. The first I knew of the accident was, when instead of the paper, his arms and head came through between the rolls. There was no other way for him to get the paper to me than to pass it around the roll as he was endeavoring to do when the accident happened. I know of no safeguards that may be put on the machines to prevent such an accident. The center of the roll is between ten and fifteen inches from the floor. At the time of the accident there was about ten inches of paper on one and six or eight inches on the other, reckoning from the radius. The rolls were about three inches apart. The man's arm was bent at the elbow, and it seems to me that his arm and head went through together. *Statement of physician:* The man's neck and rib on the right side had been fractured by accident. Death certificate submitted.

32

Accident: Burns from lime and soda.

Name: P. M——.

Married or single: Married. Seven children.

Establishment: Plant P.

Work: Furnace man.

Medical attention: His wife.

Statement of case: P. M—— came a number of years ago to Niagara Falls. Worked first at Plant M. and later at a chemical plant. Two and one-half years ago he came to Plant P. where he tends fires which heat the alkali in great pots. The worker was badly burnt by lime and soda, boiling over. The burn is partially healed but there are several less recent ones on his back and sides. *Statement of patient:* "The mixture in the kettles over the furnace consists of lime, orès, soda ash and yellow soda. When they spatter on us they not only burn because they are heated, but because they are caustic and the burn is much worse than just a heat burn. I almost always have a burn somewhere on my body but I have to keep raking the fires. Many times when I am burned I do not even have a chance to see where the burn is, and to give it the least attention. Often I have no time even to eat my lunch. Always must the fire be raked whether I am burned or not. Sometimes it seems I must go home with my burns, but I cannot leave my job. When I am home trying to sleep, my burns are often so bad that I have to lie awake all the time. I work 10 hours when I am working days, and 13 hours when I am working nights." *Medical attention:* His wife treats him at home with some preparation which she keeps on hand for that purpose. It is what some other worker told him to get, and he does not know what it is. She says, "It is no good going to a regular doctor when you have a caustic burn. They do not understand how to treat them."

33

Accident: Injured by machinery, fatal.

Name: A. B——.

Nationality: American.

Age: Thirty-four.

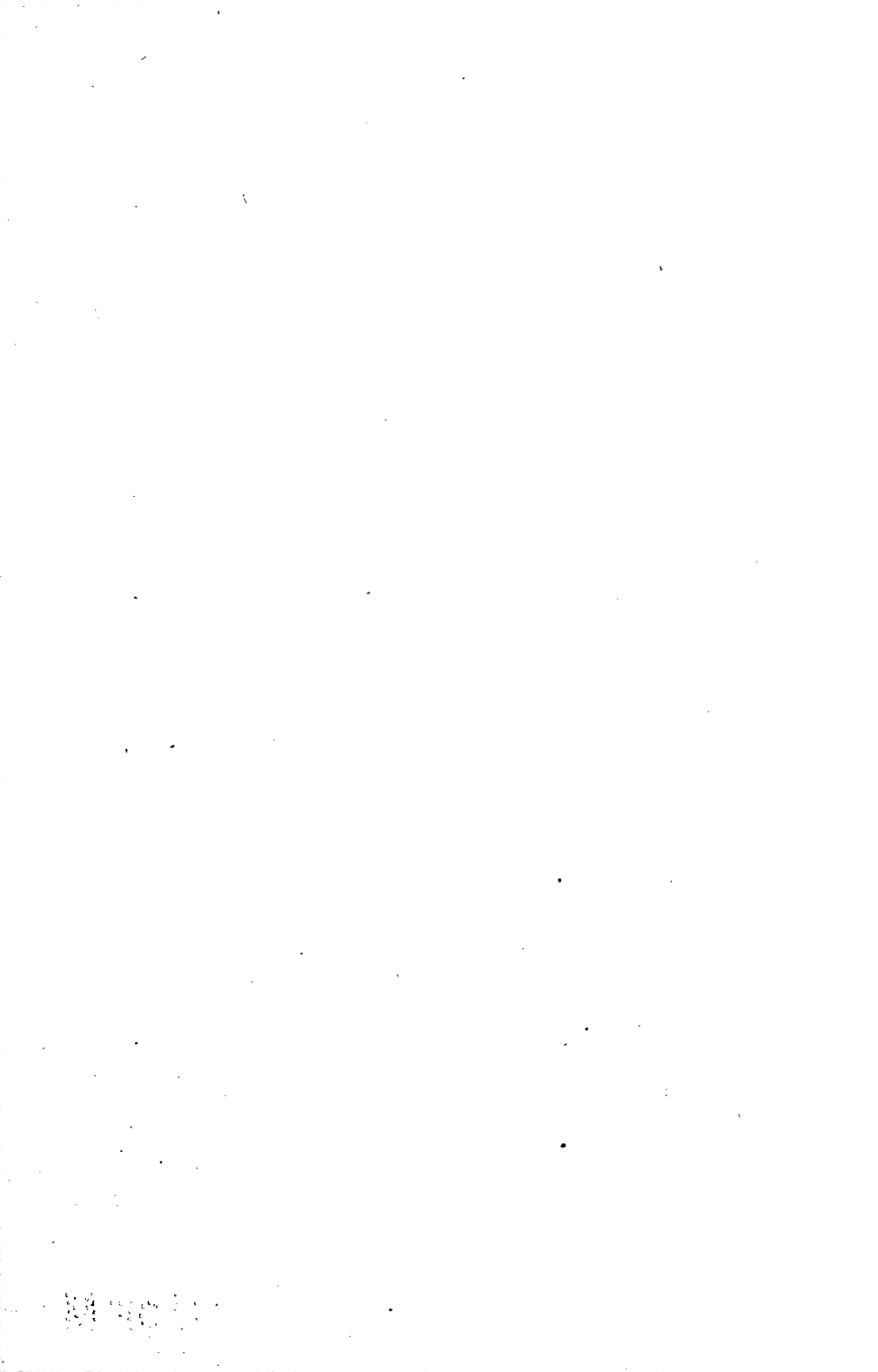
Date of accident: February 21, 1912.

Establishment: Plant P.

Work: Chief Engineer.



PLANT F.
Workers in dusty process.



Date of investigation: July 28, 1912.

Medical attention: Dr. C. W——.

Statement of case: A. B—— came to work at Plant P. in 1906. Left after 4½ years and went to a paper works company where he stayed a year, then returned to Plant P. A. B—— was caught in shaft belt and fatally mangled. He was picked up dead. *Statement of his wife:* “He was oiling a shaft, it is supposed, when he was caught by a belt and killed. He held the oil can in his hand when they found him. There was no one in the room when the accident happened. The crowding of machinery was responsible for my husband’s death. He was a careful man and loved the machinery so that he delighted in taking care of it. He wanted it always to look right and to run right. The shaft about which he was turned was not four feet from the shaft next to it and he had to crawl about with the greatest caution.

“As long ago as October of 1908, he was caught in a second belt of the same shaft in which his death occurred. At that time two bones in his arm were broken. The company paid me \$2,600 on account of my husband’s death, but money doesn’t pay for losing him.”

34

Accident: Burns from electricity, fatal.

Name: O. S——.

Nationality: American.

Age: Twenty-one.

Married or single: Single.

Date of accident: January 24, 1912.

Establishment: Plant Q.

Work: Laborer.

Date of investigation: July 29, 1912.

Medical attention: Dr. I. W——.

Statement of case: O. S—— was shutting off a dynamo and as he threw the switch an electric spark flashed out. He was frightfully burned, his clothes catching on fire. He was taken to the hospital in great agony where he died January 27, 1912. He operated this switch about 25 times before. *Statement of*

fellow-worker: "There had been some minor accidents at this same switch board and the precaution was always taken of telling the man who must operate the switch that death would occur if a short circuit was made. When O. S—— was burned, the workman nearby threw dust on him to put out the flames in his clothes. He cried to them to get out of his way and he walked out doors and lay down and rolled in the snow. His flesh lay in pieces on the floor and also come off in the snow. His hat was burned to his head, his shoes to the soles of his feet. The switch board where the shock was received has since been so fixed that this kind of an accident could not recur."

35.

Accident: Fracture of the skull.

Name: H. E——.

Nationality: Polish.

Age: Twenty-seven.

Date of accident: July 12, 1912.

Establishment: Plant Q.

Work: Laborer.

Medical attention Dr. I. W——.

Statement of case: In this case the man's skull was fractured in an accident which took place while he was at work. No data was obtainable as to how the accident occurred at E—— hospital where he was sent. He was discharged, cured, July 22, 1912.

36.

Accident: Caught in machinery, fatal.

Name: E. F——.

Nationality: German.

Age: Fifty-one.

Married or single: Married. One child.

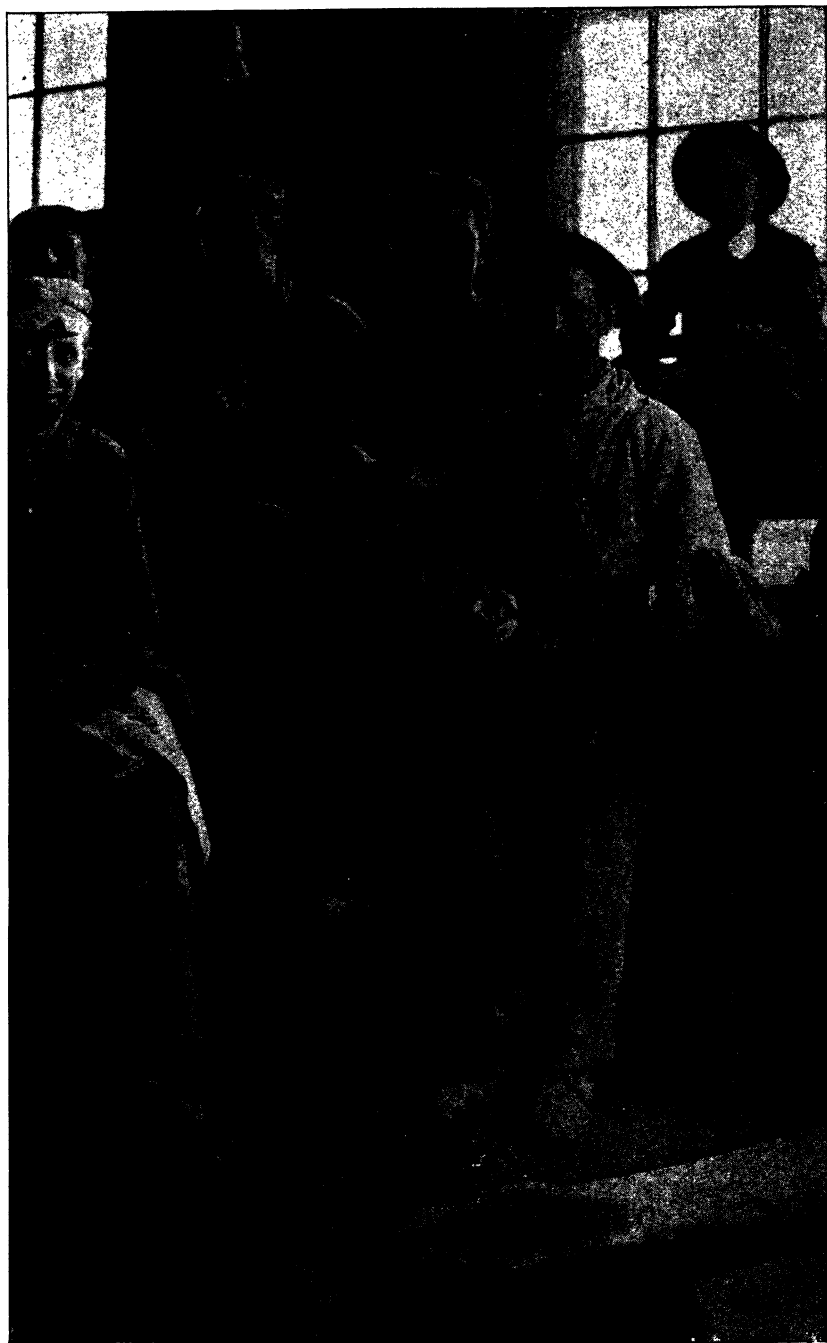
Date of accident: June 6, 1911.

Establishment: Plant Q.

Work: Machinist foreman.

Medical attention: Drs. O. W—— and I. W——.

Statement of case: E. F—— had been in charge of the wear and tear of machinery for eight years as foreman in Plant Q.



PLANT T, NIAGARA FALLS, N. Y.
Workers eating dinner in dusty, dirty factory room.

He was caught in a briquetting machine which is similar to a crusher. There were lacerated wounds on the right arm, wounds on fingers of left hand, wounds in each arm pit, and left side of his chest was crushed. He developed traumatic pneumonia, so that he died June 9, 1911. *Ante-mortem statement of patient*: "There was someone else running the machine, someone who was sent there to do the work. I was reaching over to turn down some grease cups and some part of the machine caught me, and I was thrown over the machine. I think I was caught by the belt on the clutch of the fly wheel." *Statement of fellow-worker*: "A visiting mechanic who had been sent to our factory to make some experiments for another company on June 6, 1911, started the briquetting machine after E. F—— began oiling it." *Coroner's verdict at autopsy*: "According to the evidence I find the accident the result of negligence on the part of the visiting mechanic who noticed that the machine was stopped and who threw in the starting lever without ascertaining the reason for stopping of the machine. I also find negligence on the part of E. F—— himself, who was familiar with the machine, in that he did not notify U. S—— that he was about to do some work on the machine that would be dangerous to himself if the machine was started while he was employed in the work." The Coroner also found that the position of the starting lever was out of sight of the driving mechanism and could and should be changed. He did not find sufficient evidence to warrant a charge of "Culpable Negligence" on the part of U. S—— under the penal code.

37.

Accident: Caught in rope, causing compound fracture of tibia and fibula.

Name: U. G——.

Nationality: American.

Age: Thirty-one.

Married or single: Single.

Date of accident: February 6, 1910.

Establishment: Plant K.

Work: Laborer on steam tug.

Date of investigation: July 31, 1912.

Medical attendance: Dr. E. A——.

Statement of case: U. G—— had worked 13 weeks out on the steam tug in the small inlet that feeds the machine of Plant K. He was caught in a rope as the boat was being fastened. He hurt his foot and had a compound fracture of the tibia and fibula. Silver plates had to be screwed in his ankle. Nine splinters of bones were taken out. *Present condition:* U. G—— has been unable to work since the accident. He was on crutches suffering pain, and his general health is poor.

38.

Accident: Burning by chromic acid.

Establishment: Plant L.

Work: Bench worker.

Statement of case: This man's regular work at the above factory resulted in many chrome sores on his hands. He was not warned at any time of the danger in the substances he handled and at first he was often burned. Though he left this factory nearly three years ago he still has old scars on his hands showing where the chrome sores were.

5.

THIRTY-ONE CASES OF INDUSTRIAL LEAD POISONING TRACED TO NIAGARA FALLS PLANTS BY MISS GERTRUDE E. SMITH.

Case No. 1: Lead poisoning, acute.

Name: U. R——.

Nationality: Irish.

Age: Thirty-eight.

Married or single: Single.

Dates of illness: (1) April, 1911; (2) June, 1911.

Establishment: Plant A.

Character of work: Pressing plates.

Medical attention: Dr. A. A——.

Statement of case: U. R—— was born in Ireland, and came to America in 1907. Worked first in a foundry at Florence, N. J., then for a construction company as a laborer, at Gasport, N. Y. In January, 1908, he went to work on farm. In January, 1909, he began working for Plant A in shipping room, and later worked on hydraulic press where positive and negative plates are made. Left this position after being there 8 months to fire a boiler for a water company. January 3, 1911, returned to above factory in same capacity as last. *Illness:* After three months U. R—— was taken sick with acute lead poisoning. He spent 6 days in St. A——'s Hospital this time. Returning to work, had a second attack on June 19, 1911. Taken to E—— Hospital. In his rundown condition, he contracted typhoid fever. Did not get out of the hospital until October 19, 1911. *Symptoms:* Cramps, extreme nausea, loss of appetite. Gum line showed plainly for two months after second attack. *Statement of patient:* Works, and says he feels better. He chews tobacco, drinks beer, and "does not mind a glass of whiskey now and then." Was very particular to wash hands frequently while working for above factory. Never sick before in his life that he can remember. There are no new lead pipes in the house where patient lived at time of attack. *Statement of Dr. A. A——:* "This man was sick with acute lead poisoning when he came under my care."

Case No. 2: Lead poisoning, chronic.

Name: O. M——.

Nationality: Scotch.

Age: Sixty-four.

Married or single: Married. Two children.

Date of illness: February, 1911.

Establishment: Plant A.

Character of work: Drying and sifting lead in developing room.

Medical attention: Dr. H. A——.

Statement of case: O. M—— was born in a small town near Quebec, Canada. He worked as fireman on local trains. Came to Niagara Falls in September, 1909, and worked as teamster. May 30, 1910, began work at Plant A. *Illness:* After working 9 months, O. M—— began to feel sick. Kept at work without medical attention for one month and was then ill at home 2 days, with doctor in attendance. *Symptoms:* Gum line persisted until October, 1911; loss of appetite, continual muscular pains; aches in every joint of his body; eyesight, hearing and memory affected; left arm and hand often numb and partially paralyzed so that he must take hold of it with his right hand to lift it from one place to another. Fingers on left hand often drawn together; hand shrunk; extreme debility. *Present condition:* General debility; eyesight, hearing and memory poor. Left arm and hand frequently numb and partially paralyzed. Is unable to do hard work. *Statement of patient:* "When I first began to feel sick I stuck to my job as long as I could, though I could eat almost nothing. When I came home I would throw myself down on the couch and sleep nearly all the time. When I went to work for the above factory they told me if I wore a muzzle there would be no danger in the work I did, but there were not enough furnished for every one to use, and I had one only part of the time. Washed my hands at an average of 5 or 6 times a day. I never take any alcoholic drinks. There were no new lead pipes about the house where I lived. After I went back to my work after being home sick 2 days, and the doctor had told me I was plumb full of lead, I decided not to work in the lead room any more and told my 'boss' that. They then put another man in my place and told me I should teach him how to do my work. They put

me in to work handling the vacuum drier. The man I was to teach did not do his work right, they thought, and the company held both of us responsible. We were discharged at the end of two days I have brought suit against the company for damages, and the case is to come up in October, 1912." *Statement of physician*: "The man is unfit for anything but the easiest kind of work; his case is chronic lead poisoning."

Case No. 3: Lead poisoning, acute.

Name: O. F——.

Nationality: Scotch.

Age: Forty-nine.

Married or single: Married. Two children.

Date of illness: November, 1911.

Establishment: Plant A.

Character of work: Cleaning plates in the casting room.

Medical attention: Dr. H. A——.

Statement of case: O. F—— was born in Scotland, and came to Niagara Falls June 16, 1910. He worked at Plant A in the general repair room, then in casting room, where he sawed grids and cleaned plates. *Illness*: After doing the latter work for a few weeks he felt ill — frequently had to stay at home a day or two. Came home evenings too sick to eat. On above date he was taken sick with acute lead poisoning. *Symptoms*: General nausea, sickening, sweet taste in mouth, flesh soft, no color in face, muscular pains. *Present condition*: Recovered after several weeks. He smokes, but does not take alcoholic drinks. *Statement of patient*: "I went to work at the paper mill when I was well because I was afraid I would have lead poisoning again. I would not work where lead was for anything, now that I know what it does to a man. I used to be so sick when I came home that I thought I would never be well again." *Statement of physician*: "The man had acute lead poisoning."

Case No. 4: Lead poisoning, chronic.

Name: O. J——.

Nationality: Scotch-American.

Age: Fifty-nine.

Married or single: Married. Three children.

Date of illness: November, 1910.

Establishment: Plant A.

Character of work: Dipping plates.

Medical attention: Dr. C. W——.

Statement of case: O. J—— was born in Lewistown, N. Y. Had worked as a stone dresser since he was 10 years old. Worked in several different factories during the winter. One winter worked for a paper mill at Niagara Falls, second winter as a furnaceman in a factory, and in October, 1909, went to work for Plant A dipping plates and working on the sponge cells. Went back to stone dressing about February, 1910. In the fall of 1910 he was back again to the factory. *Illness:* In November, 1910, was taken sick and sent to E—— Hospital, where he stayed 5 days. It was several weeks before he was sufficiently recovered to do any work. *Symptoms:* Cramps, muscular pains, extreme nausea, gum line, wrist drop, impaired eyesight, general debility. *Present condition:* Weak, slight weakness of wrists, impaired eyesight. *Statement of patient:* O. J—— says he was living in a house where there were no new lead pipes at time of sickness; he smokes and "takes most any kind of a drink." After this sickness he would not go again where he was exposed to lead poisoning. He got a job in the furnace room of another factory. *Statement of physician:* "This man had a bad case of lead poisoning."

Case No. 5: Lead poisoning, chronic.

Name: E. W——.

Nationality: Russian.

Age: Twenty-six.

Married or single: Married. One child.

Date of illness: December, 1909.

Establishment: Plant A.

Character of work: Mixer and presser.

Medical attention: Dr. H. A——.

Statement of case: E. W—— worked in Russia as blacksmith and machinist. Came to this country in 1905. Worked as blacksmith at West Seneca, N. Y., in the machine room of a glass factory at Pittsburg, Pa. Came to Niagara Falls in the latter

part of 1909. Began work after a few weeks for Plant A. *Illness:* Taken sick after having been there only two weeks with a severe attack of colic, cramps, loss of appetite. He was taken to the E—— Hospital. *Symptoms according to statement of patient:* Gum line showed plainly for several weeks. Cramps, loss of appetite, sweet taste in mouth. *Present condition:* This man is weak and unable to work. Has never been able to get a good position since working for Plant A on account of his general debility. *Statement of patient:* There were no new lead pipes in the house where E. W—— lived at the time of the attack. He smokes very seldom; never takes alcoholic drinks. *Statement of physician:* "The man came to my office and fell on the floor when he was inside of the office door. Complained of pains in his stomach. I had him removed to the hospital. I do not know what was the matter with him. It may have been lead poisoning."

Case No. 6: Lead poisoning, acute.

Name: D. J——.

Nationality: Austrian.

Age: Thirty-eight.

Married or single: Single.

Date of illness: November, 1911.

Establishment: Plant A.

Character of work: Mixer.

Medical attention: Dr. H. A——.

Statement of case: D. J—— came from Austria in 1903. He worked in power house at Niagara Falls, Canada and on farms for several years. September, 1911, went to work in Plant A. *Illness:* After working there one month he was taken sick with acute lead poisoning. *Symptoms:* Cramps in stomach; extreme nausea. Removed to the E—— Hospital, where he remained six weeks. Had pains in the lower parts of the back. *Present condition:* He is now under the care of Dr. A—— of Buffalo. He did not return to Plant A. Smokes some and drinks only beer. *Statement of patient:* "I cannot lift anything heavy since being sick, and the pains in my back continue." *Statement of Dr. H. A—— :* "I am not familiar with the name of this man; he may, however, have had acute lead poisoning in the form of lead colic, and I may have treated him for the same."

Case No. 7: Lead poisoning, acute.

Name: O. C——.

Nationality: Polish.

Age: Twenty-eight.

Married or single: Single.

Date of illness: Fall of 1910.

Establishment: Plant A.

Character of work: Lead dipper.

Medical attention: Dr. H. A——.

Statement of case: O. C—— worked on farm in Poland until 1901, when he came to America. Worked on farms and as an engineer on railroads in Canada. In the fall of 1910 came to Plant A to work as a lead dipper. *Illness:* After working for 9 weeks had a severe attack of lead poisoning. *Symptoms:* Cramps, extreme nausea, muscular pains and headaches. Marked gum line. *Present condition:* Had never fully recovered. Drinks beer with meals. *Statement of patient:* No new lead pipes in house. Health so undermined that he does not think he will regain it. Cannot stand hard work. *Statement of physician:* "The man has lead poisoning."

Case No. 8: Lead poisoning.

Name: R. F——.

Date of illness: January, 1911.

Establishment: Plant A.

Medical attention: Dr. A. O——.

Statement of case: While working at Plant A this man was taken sick with lead poisoning. He is now living at the Volunteer Firemen's Home in Rochester. Dr. A. O——, who attended R. F——, said he had lead poisoning, but did not specify whether it was acute or chronic. Further information could not be obtained.

Case No. 9: Lead poisoning, acute.

Name: A. J——.

Nationality: Polish.

Age: 34.

Married or single: Married. Five children.

Date of illness: July, 1911. (First attack.)

Establishment: Plant A.

Character of Work: Presser on lead plates.

Medical attention: Dr. H. A——.

Statement of case: A. J—— was born in Poland where he worked on farm. In 1910 came directly to Niagara Falls. Worked first at a chemical plant doing outside work. Then worked for a lighting company. Began work at Plant A. in May, 1911. *Illness:* Taken sick with acute lead poisoning, attack lasting two weeks. Returned to work in a few weeks and suffered a second attack, lasting three weeks. *Symptoms:* Cramps, abdominal pains, severe headaches. *Present condition:* Completely recovered. *Statement of patient:* "Smokes seldom; does not take alcoholic drinks. The house where he lived at time of attacks had no new lead pipes. I went elsewhere to work after my second attack." *Statement of physician:* "I cannot recall this case exactly. It was probably an acute case."

Case No. 10: Lead poisoning, chronic.

Name: I. E——.

Nationality: American.

Age: 27.

Date of illness: October, 1909.

Establishment: Plant A.

Character of work: Worked on the hydraulic press.

Medical attention: Dr. I. E——.

Statement of case: I. E—— was born in Chicago. For over 4½ years he was a livery driver in Niagara Falls. In April, 1907, he gave up this job to work for Plant A, moving generators. After nine months the manager came to him one day and said: "A fellow who is working on the hydraulic press has lead poisoning, you take his place." *Illness:* I. E—— was taken sick with acute lead poisoning one morning after going to work as usual. A doctor called to attend him at his home where he was sick for 14 weeks, and was in bed for eight weeks. *Symptoms:* The attack came on suddenly making the man feel weak all at once so that he could hardly stand up. He could not stand alone when brought home. He had no feeling in his

left side. He vomited and had pains in his stomach. Within a day or two feeling gradually returned to his entire left side except his hand and the lower part of his arm. For several months after attack he was never sure of being able to hold anything in his left hand. *Present condition*: Clean shaven. Wrist drop shows plainly and there is no feeling in middle finger of left hand. *Statement of patient*: "I was never given the promised respirator or gloves which I asked for when I began to work on the hydraulic press. My wages were \$21.90 a week, working 10 hours a day. I do not smoke or drink." *Statement of physician*: "This man has a bad case of chronic lead poisoning."

Case No. 11: Lead poisoning, acute.

Name: U. W——.

Nationality: Polish.

Age: 23.

Married or single: Single.

Date of illness: December, 1911.

Establishment: Plant A.

Character of work: Plaster.

Medical attention: Dr. A. A——.

Statement of case: U. W—— came to this country in 1908. Worked 18 months for a metal company in the pot room as a cleaner, then went to Plant A where he worked for three months. *Illness*: He was taken sick with acute lead poisoning and removed to St. A——'s Hospital. *Symptoms*: Colic and nausea. *Present condition*: Recovered. Man looks especially clean and neat, and clean shaven; speaks English. *Statement of patient*: There are no new lead pipes at the address where he was living at the time of the attack. He washed his hands before eating and often during the day. He smokes. *Statement of physician*: "This man had acute lead poisoning."

Case No. 12: Lead poisoning, acute.

Name: I. J——.

Nationality: Scotch.

Age: 27.

Married or single: Single.



PLANT A, NIAGARA FALLS, N. Y.

I. D—, a worker in Plant A, has white drop from lead poisoning, and is 27 years old.



Date of illness: August, 1911.

Establishment: Plant A.

Character of work: Molder in red lead room.

Medical attention: Dr. H. A——.

Statement of case: I. J—— was born in Scotland and came to America, May, 1911. Went to work at once for Plant A. Wages, \$12.00 a week at first, then \$13.50, works 10 hours a day. *Illness:* After working three months, was taken sick with acute lead poisoning. *Symptoms:* Had cramps, sweet taste in mouth, loss of appetite, sick several weeks. *Present condition:* Recovered. *Statement of patient:* Patient said there were no new lead pipes about the house where he lived when he had the attack. The patient was unable to go with the investigator to the doctor's office for identification. *Statement of Dr. H. A——:* "I know nothing about this man. Cannot recall that I ever treated him."

Case No. 13: Lead poisoning, acute.

Name: E. P——.

Nationality: Russian.

Age: Thirty-two.

Married or single: Married. Three children.

Dates of illness: June, 1912; July 28, 1912.

Establishment: Plant C.

Character of Work: Plaster in the red litharge room.

Medical attention: Dr. A. R——.

Statement of case: E. P—— worked on farm in Russia, but wishing to better his condition he came to this country April, 1912, leaving his wife and three children to come later. While working at Plant C, he had a mild attack of acute lead poisoning in June which kept him home two weeks; second attack, July 28, 1912, when he was taken to St. A——'s Hospital, where he remained until August 1st, 1912. *Symptoms:* Abdominal pains; lack of appetite; general debility; gum line; sickening yellow pallor. *Present condition:* As above; has not recovered from last attack. He smokes once in a while, never takes alcoholic drinks. The house in which he lives has no new lead pipes. Surroundings, not clean. *Statement of patient:* Does

not intend to return to his old work but hopes to find employment as an out-of-doors laborer. *Statement of physician*: "This man had acute lead poisoning."

Case No. 14: Lead poisoning, acute.

Name: A. L——.

Nationality: Syrian.

Age: Twenty-two.

Date of illness: May, 1912.

Establishment: Plant C.

Character of work: Plaster in red litharge room.

Medical attention: Dr. I. J.

Statement of case: A. L—— was born in Beirut, Syria, and came to this country in 1908 and worked as a laborer around Niagara Falls where he has relatives. After 1½ years, went to a power company as a signal man. In January, 1912, went to work at Plant C. *Illness*: A. L—— had acute lead poisoning after being at this factory five months. Was sick three weeks. *Symptoms*: Pains in his stomach. He could not eat. *Present condition*: Recovered. Acts as a clerk in the store of the family with whom he boards. Smokes cigars, and drinks beer; has done so since 15 years old. His surroundings are very clean; there are no new lead pipes in the house where he has lived. Face smooth shaven. *Statement of patient*: His salary was \$2.50 a day for 5½ days' work a week. Physician advised him not to return to the kind of work he had been doing. *Statement of physician*: "This man had acute lead poisoning."

Case No. 15: Lead poisoning, acute.

Name: O. S——.

Nationality: Russian.

Age: Thirty-eight.

Married or single: Married. Three children.

Date of illness: April, 1912.

Establishment: Plant C.

Character of Work: Making lead plates.

Medical attention: Dr. A. R——.

Statement of case: O. S—— had left a family in Russia. He came to America from Russia in May, 1911, and went to work

at Plant C. *Illness:* He was taken with acute lead poisoning and was sick for 3 weeks. *Symptoms:* Cramps and nausea. *Present condition:* Recovered. *Statement of patient's friends:* The patient returned to Russia in May, 1912, so that no information could be obtained from him, but the facts in connection with the man were given by the family with whom he boarded. *Statement of Dr. A. R.—:* "I treated O. S— for acute lead poisoning."

Case No. 16: Lead poisoning, acute.

Name: I. J—.

Nationality: Russian.

Age: Forty.

Date of illness: May, 1912.

Establishment: Plant C.

Character of work: Mixer in lead room.

Medical attention: Dr. A. R—.

Statement of case: I. J— had been in America for a few months. He suffered an attack of acute lead poisoning while working at Plant C. Little could be learned of the facts in this case as patient went back to Russia in June, 1912. According to friends, I. J— had been a healthy man before his attack. He neither smoke nor drank. Dr. A. R— confirmed this as a case of acute lead poisoning.

Case No. 17: Lead poisoning, acute.

Name: I. M—.

Nationality: Polish.

Age: Forty-two.

Married or single: Married. Two children.

Date of illness: March, 1912.

Establishment: Plant C.

Character of work: Painting lead plates.

Medical attention: Dr. A. R—.

Statement of case: I. M— came from Poland with his family in 1910. While working at Plant C he was taken ill with an attack of acute lead poisoning lasting one and one-half months. The first two or three weeks, was treated at home, then

sent to St. A——'s Hospital, where he remained for 3 weeks. Dr. A. R—— confirmed this as a case of acute lead poisoning.

Case No. 18: Lead poisoning, acute.

Name: A. J——.

Nationality: Polish.

Age: Forty-six.

Married or single: Married. Four children.

Date of illness: January 1, 1912.

Establishment: Plant C.

Character of work: Painting lead plates.

Medical attention: Dr. A. R——.

Statement of case: A. J—— used to work in Poland as "a sort of conductor." With his family he came to America in 1905. Worked as street laborer in Buffalo, N. Y. In October, 1911, he began working at Plant C. After three months he had acute lead poisoning and was sick for 2 weeks. Present condition: Well. Statement of patient's daughter: "My father did not return to work at Plant C, but found employment with a builder, as he feared further lead poisoning." Statement of Dr. A. R——: "This man had acute lead poisoning."

Case No. 19: Lead poisoning, acute.

Name: R. T——.

Nationality: Italian.

Age: Twenty-three.

Date of illness: November, 1911.

Establishment: Plant C.

Character of work: Mixer in the red litharge room.

Medical attention: Dr. I. J——.

Statement of case: R. T—— came to America May, 1904.

Went to work on railroads in the vicinity of Buffalo. September 1, 1911, went to work at Plant C. *Illness:* After working two months he was taken sick with acute lead poisoning; he was ill for 1½ months and during this time he received \$1.00 a day from factory benefit insurance, to which he had contributed 10 cents a week. *Symptoms:* Colic, nausea, headache. *Present condition:* Well; clean shaven; bright appearing and frank in his

manner. He is now working on railroads as a section hand. *Statement of patient:* He was not particular about washing hands at noon. Did not realize the dangers of his work. Never saw a poster regarding cleanliness, etc., in the factory. *Statement of Dr. I. J. —:* "This man had acute lead poisoning."

Case No. 20: Lead poisoning, acute.

Name: P. A——.

Nationality: American.

Age: Sixty-two.

Married or single: Married. Eight children.

Date or illness: Indefinite; fall of 1911.

Establishment: Plant C.

Character of work: Mixer in the red lead room and weigher of cement.

Medical attention: Dr I. R——.

Statement of case: P. A—— was at work only a few weeks at Plant C before he developed lead poisoning. *Illness:* Acute lead poisoning; sick one month, in bed two weeks. *Symptoms:* Severe cramps in abdomen; extreme nausea; could not eat; had a sweet taste in his mouth. *Present condition:* Declares he has entirely recovered, but looks emaciated. This case was confirmed as acute lead poisoning by Dr. I. R——.

Case No. 21: Lead poisoning, acute.

Name: L. P——.

Nationality: Polish.

Age: Twenty.

Married or single: Single.

Date of illness: September 18, 1911.

Establishment: Plant C.

Character of work: Paster on lead plates.

Medical attention: Dr. A. R——.

Statement of case: L. P—— was born in Poland and came to America in 1909. March, 1911, he began work for Plant C in the read litharge room. *Illness:* While working at Plant C, L. P—— suffered with a severe case of lead poisoning. He was ill for six months. Case sufficiently serious to be recorded in

factory insurance books. *Symptoms*: Pain in the abdomen, extreme nausea, dizzy headache; sick 10 days. *Statement of patient*: "I received \$15.00 a week as a paster on plates, and had worked only a few months when I felt sick. Upon recovery I went elsewhere to work." *Statement of Dr. A. R—*: "L. P— had acute lead poisoning and I treated him."

Case No. 22: Lead poisoning, acute.

Name: O. S—.

Nationality: Russian.

Age: Thirty-eight.

Married or single: Married. Three children.

Date of illness: April, 1912.

Establishment: Plant C.

Character of work: Making lead pots.

Medical attention: Dr. A. R—.

Statement of case: O. S— had left a family in Russia. He came to America from Russia in May, 1911, and went directly to work at Plant C, so far as could be learned. *Illness*: He was taken with acute lead poisoning in April and was sick for 3 weeks. *Symptoms*: Cramps and nausea. *Present condition*: Recovered. *Statement of patient's friend*: The patient returned to Russia in May, 1912, so that no information could be obtained from him, but the facts in connection with the man were given from the family with whom he boarded. *Statement of Dr. A. R—*: "I treated this man for acute lead poisoning."

Case No. 23: Lead poisoning, chronic.

Name: U. J—.

Nationality: Polish.

Age: Forty.

Married or single: Married. Four children.

Date of illness: August, 1911.

Establishment: Plant C.

Character of work: Mixer in the paint room.

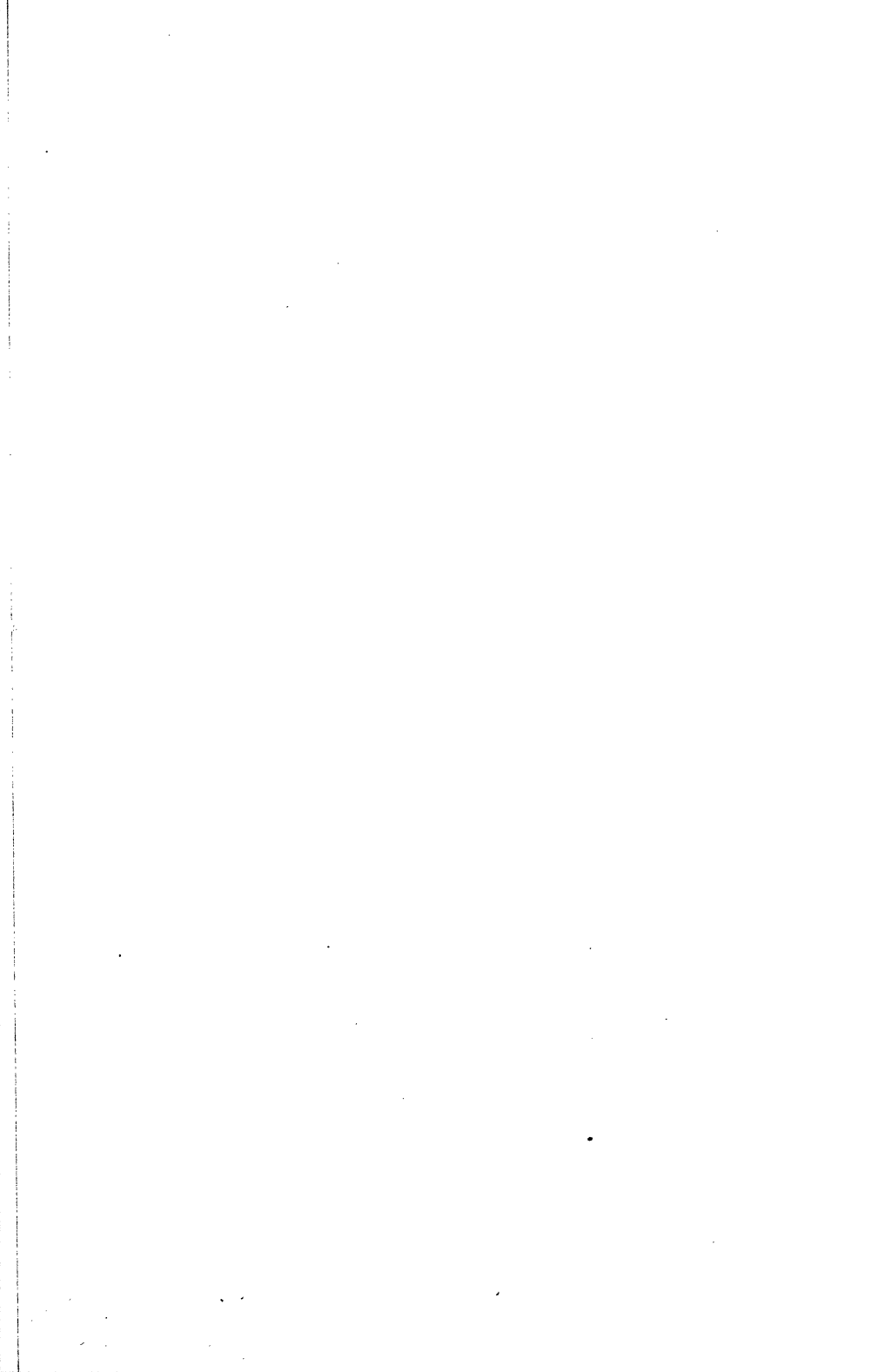
Medical attention: Dr. A. R—.

Statement of case: U. J— left his family in Austria and came to this country in 1909. First worked in cotton mills in Little Falls, N. Y. In November, 1910, began work at Plant C.



PLANT C, NIAGARA FALLS, N. Y.

B. D——, showing teeth gone and others blackened from fumes of H_2SO_4 in developing room.



Illness: Worked nine months, when he was taken sick with chronic lead poisoning. *Symptoms:* Colic; general debility. He was unable to work for 3 weeks. *Present condition:* Upon returning to work U. J—— was put in the acid room, where he is now working. His face is colorless and he has severe headaches and dizzy spells. He wears a small mustache and looks like a man of 40. He smokes and drinks beer with his meals, which consist mostly of bread and soup. He goes home for his lunch, as he lives near the factory; he can “make it” in half an hour, the time allowed him at noon. The landlord of a Polish saloon over which U. J—— lives, paying \$3.00 a week board, interpreted for the investigator. *Statement of physician:* “This man has chronic lead poisoning.”

Case No. 24: Lead poisoning, acute.

Name: U. A——.

Nationality: Russian.

Age: Thirty-seven.

Married or single: Married. Two children.

Date of illness: July, 1911.

Establishment: Plant C.

Character of work: Tester of plates.

Medical attention: Dr. A. A——.

Statement of case: U. A—— left his family in Russia to come to this country about 1905. He worked as a laborer in the construction of a paper mill in Canada. Came to Niagara Falls to work for a metal company as a general laborer about the plant. Early in 1911 he began work at Plant C. Was in the room where the storage batteries are made. He tested, adjusted and removed plates and worked some on the assembly table in the same room. *Illness:* July, 1911, he had an attack of acute lead poisoning; was sent to St. A——’s Hospital for 21 days. *Symptoms:* Cramps and nausea. *Present condition:* He is now working on a farm at Gasper, N. Y. He is strong and healthy looking; wears a mustache. *Statement of friends:* “The house where he lived while in Niagara Falls was clean and well kept and there were no new water pipes there.” *Statement of physician:* “This man had acute lead poisoning.”

Case No. 25: Lead poisoning, acute.

Name: O. F——.

Nationality: Polish.

Age: Twenty-five.

Date of illness: May, 1911.

Establishment: Plant C.

Character of work: Moulder.

Medical attention: Dr. I. J——.

Statement of case: O. F—— had served in the army in Poland. One week after reaching Niagara Falls he began work at Plant C, pouring hot lead into molds to make lead plates. *Illness:* After two months' work he was taken sick with acute lead poisoning and was unable to work for 5 weeks. *Symptoms:* Colic; general debility. *Present condition:* Is not yet well and receives treatment from the doctor; smokes a pipe constantly when not working. His face has a yellowish appearance and his eyes are expressionless. *Statement of patient:* He says he never saw any notice regarding cleanliness, etc., posted in the factory. He had half an hour for lunch. When he returned to work he was placed in the acid room. His salary is \$11.00 a week. He pays \$2.50 a week for room with friends and eats there occasionally. *Statement of physician:* "O. F—— had acute lead poisoning and has not been well since."

Case No. 26: Lead poisoning, acute.

Name: L. B——.

Nationality: Scotch-Irish.

Age: Forty-three.

Married or single: Single.

Date of illness: May, 1911.

Establishment: Plant C.

Character of work: Pasting plates and weighing.

Medical attention: Dr. A. R——.

Statement of case: On January 15, 1911, B. L—— went to work at Plant C in the red lead room. He was there 4 months when first attacked. *Illness:* Had cramps, headache, wrist drop in both hands, muscular pains. He was sent to E—— Hospital, where he remained 2 weeks. *Present condition:* Completely

recovered. *Statement of Dr. O. R—*: "This was a case of acute lead poisoning."

Case No. 27: Lead poisoning, chronic.

Name: E. C—.

Date of illness: March 9, 1911.

Establishment: Plant C.

Character of work: Paster in the red litharge room.

Date of investigation: July 27, 1912.

Medical attention: Dr. I. W—.

Statement of case: This man came from the Buffalo plant to work at Niagara Falls when a new branch of Plant C was opened 2½ years ago. He worked 1¾ years pasting plates. *Illness*: He had an attack of lead poisoning in March. After being sick for 7 days he was taken to E— Hospital. *Symptoms*: He had colic and general debility. *Statement of Dr. I. W—*: "The case of E. C—is chronic lead poisoning. It was traceable to his occupation." The E— Hospital has this man registered, but gives no diagnosis of the case whatever.

Case No. 28: Lead poisoning, chronic.

Name: I. P—.

Nationality: Polish.

Age: Thirty-eight.

Married or single: Married. Three children.

Date of illness: February, 1911, to March, 1912.

Establishment: Plant C.

Character of work: Inspector of plates.

Medical attention: Dr. I. J—.

Statement of case: I. P— had been a carpenter in Poland and came to this country in 1910. Went to work at Plant C in the paint room, inspecting and cleaning plates. *Illness*: In February, 1911, he suffered his first attack of lead poisoning, lasting 10 days. He returned to work in the latter part of March, and had a second attack; sick 14 days. After about two weeks he had a third attack; sick for 8 days. *Symptoms*: Colic; general weakness; gum line. *Present condition*: Man looks sick; looks 50 years

old; is pale; complains of pain in his stomach; says he cannot eat meat; is obliged to live on bread and soup. He never smoked more than one cigar a day and never takes alcoholic drinks of any kind. His salary is \$12.00 a week, \$2.50 of which he pays for his meals and board with a Polish family. *Statement of Dr. I. J*——: “I. P—— had a case of chronic lead poisoning.”

Case No. 29: Lead poisoning, acute.

Name: R. M——.

Nationality: Russian.

Age: Twenty-five.

Married or single: Single.

Date of illness: February, 1910.

Establishment: Plant C.

Character of work: Worked where storage batteries are charged.

Medical attention: Dr. A. A——.

Statement of case: R. M—— came to this country in 1908 from Russia. He first worked for a metal company for two years; then entered Plant C, where he worked seven months before he was ill. R. M—— did not give up his work when he was first taken sick. When he had become quite ill, however, he was sent to St. A——’s Hospital, where he remained 12 days. *Symptoms: Pains in his stomach; loss of appetite. Present condition: Recovered. Statement of patient: “My hours were from 7 A. M. to 5:30 P. M., with half an hour for lunch. Salary, \$2.00 a day. I left Plant C after my sickness on account of the danger of further lead poisoning.” Statement of doctor: “R. M*—— had acute lead poisoning.”

Case No. 30: Lead poisoning, acute.

Name: E. N——.

Nationality: Italian.

Age: Twenty-nine.

Date of illness: March, 1912.

Establishment: Plant C.

Character of work: Painting lead plates.

Medical attention: Dr. I. J——.

Statement of case: E. N—— came to America May 19, 1907, from Italy. First worked as a laborer for contractors. December 31, 1911, went to work at Plant C in the red litharge room.

Illness: After working 3 months he developed lead poisoning and was sick 32 days; the first two weeks at his home. After the second week he went to St. A——'s Hospital. *Symptoms:* Colic; loss of appetite; extreme nausea. *Present condition:* Well. Smokes moderately; he does not take alcoholic drinks. *Statement of patient:* He returned to work at Plant C when well and asked for different work. It was refused, so he "quit the job" and went back to work with contractors as a laborer. Salary while employed by the factory, \$12.00 a week, or 20 cents an hour. He paid 10 cents a week to belong to a benefit society. They paid him \$1.00 a day for the 32 days he was sick. *Statement of physician:* "This man had acute lead poisoning."

Case No. 31: Lead poisoning, chronic.

Name: T. J——.

Nationality: German-American.

Age: Thirty-seven.

Married or single: Single.

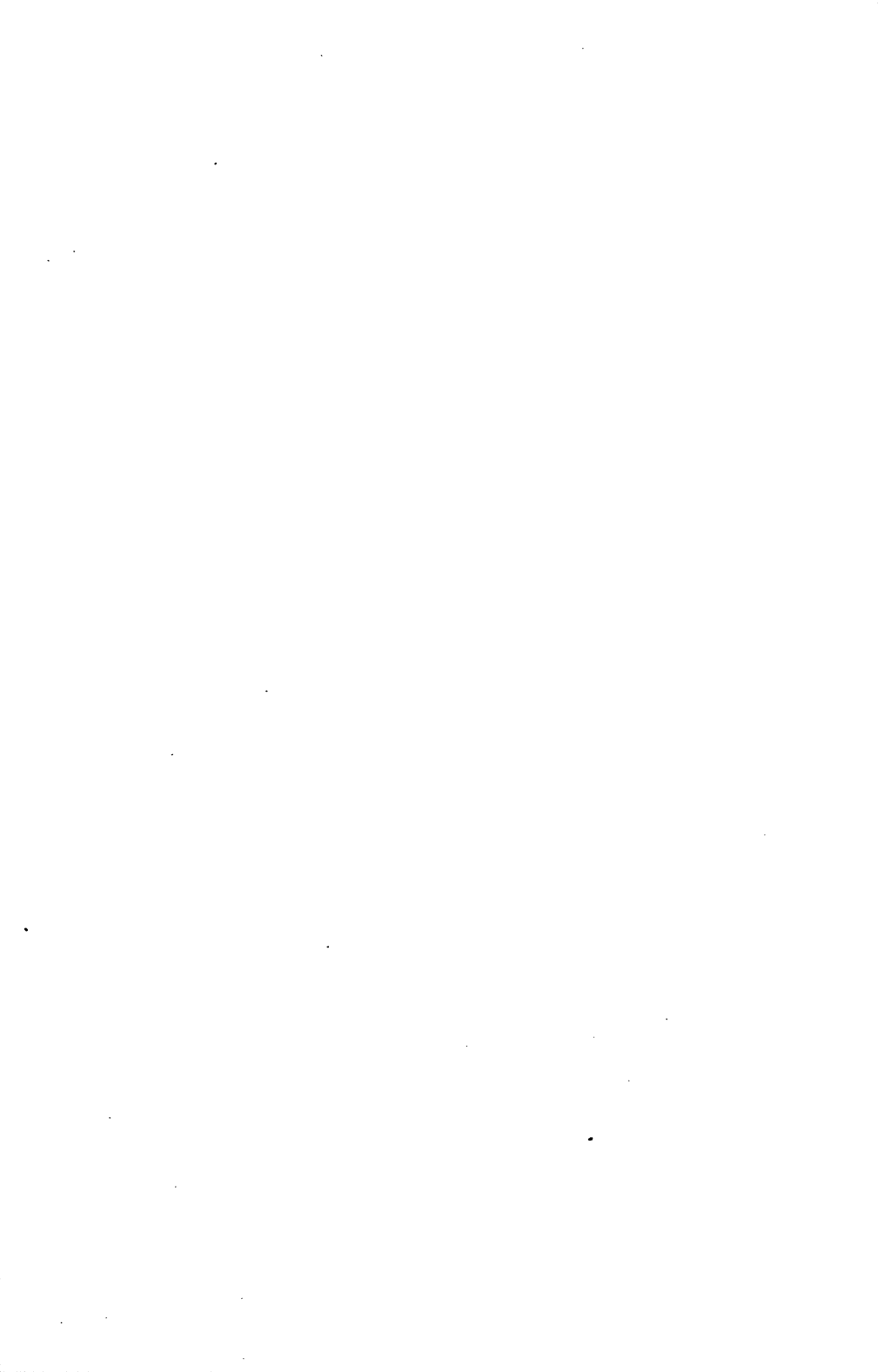
Date of illness: June 15, 1912.

Establishment: Plant X.

Character of work: Setting type by hand.

Medical attention: Dr. B. T——.

Statement of case: T. J—— is a lifelong resident of Niagara Falls and vicinity. Has been a printer 23 years. *Illness:* Taken sick with chronic lead poisoning. *Symptoms:* Paralysis of entire left side above waist, including arm and face. *Present condition:* Sensory paralysis still existing in lower arm and hand. Face and upper arm have regained feeling almost entirely. Is highly intelligent man and keenly alert to his condition. *Statement of patient:* This man says he is a heavy smoker, using a pipe outside of working hours. He takes alcoholic drinks, but not to an excessive degree. His case of chronic lead poisoning was confirmed by Dr. B. T——.



6.

COMPARATIVE TABLES OF ACCIDENTS IN THE
CHEMICAL INDUSTRIES.

TABLES COMPILED BY JACOB FELDBAUM SHOWING THE ACCIDENTS
AND DANGERS OF THE CHEMICAL INDUSTRIES IN NEW YORK
STATE IN COMPARISON WITH THOSE OF VARIOUS EUROPEAN
COUNTRIES

TABLE NO. 1—COMPARATIVE DANGERS OF THE CHEMICAL INDUSTRIES IN NEW YORK STATE AND IN ENGLAND, FRANCE AND GERMANY.

STATE OR COUNTRY AND YEAR.	Number of estab- lish- ments.	NUMBER OF EMPLOYEES.				NUMBER OF PERSONS KILLED OR INJURED.				DISABILITIES.				RESULTS UNKNOWN.	
		Total.	ADULTS.		Minors	TOTAL NUMBER.	DEATHS.		PERMANENT.	TEMPORARY.		Total.			
			Male.	Female.			Total.	Rate per 1000.		Total.	Rate per 1000.		Total.		Rate per 1000.
New York State, 1910 ¹	74	5,746	96.9	2.9	0.2	816	142	6	1.04	81	14.1	729	126.8	.....
England, 1907 ².....	.....	109,488	77.4	11.17	11.4	904	8,26	49	0.45	.....	.....	.....	.....	.....
Germany, 1907 ³	8,618	206,263	.....	.....	.....	13,034	63.19	20	0.75	860	9.13	12,154	53.22	.....
France, 1905 ⁴.....	.....	122,400	79.5	16.8	4.7	13,039	122.4	57	0.5	126	1.2	12,670	118.8	186

¹ N. Y. State Dept. of Labor, 1910, N. Y. State Census of Manufactures Bull. 1910, pp. 5 Annual Reports on Factory Inspection, Mercantile Inspection, Mediation and Arbitration.

² Report of Chief Inspector of Factories and Workshops, 1907, pp. 310 to 312; Summary of Returns of Persons Employed in 1907 in Non-Textile Factories Accounts and Papers British Home Office, 1910, pp. 6 to 8.

³ Amtliche Nachrichten des Reiches-Versicherungsamts 1910, 1. Beiheft, 1 Teil: Gewerbeunfallstatistik für das Jahr 1907, pp. 2 to 191.

⁴ Rapports sur l'Application des Lois Règlementant le Travail in 1905. Direction du Travail Ministère du Travail et de la Prévoyance sociale 1905, 478 pp.

An examination of the above table No. 1 will reveal the following facts:

- (1) The total number of accidents per 1,000 workers in the chemical trades is *greater* in New York State than in England, France or Germany.
- (2) The number of permanent injuries per 1,000 workers in the chemical trades is *greater* in New York State than in England, France or Germany.
- (3) The number of fatalities per 1,000 workers in the chemical trades is *greater by far* in New York State.

TABLE NO. 2—COMPARATIVE NUMBER OF ACCIDENTS IN THE CHEMICAL TRADES AND IN ALL THE INDUSTRIES IN NEW YORK STATE AND IN ENGLAND, FRANCE AND GERMANY.²

STATE OR COUNTRY AND YEAR.	TOTAL NUMBER OF EMPLOYEES.		TOTAL NUMBER OF ACCIDENTS.		NUMBER OF PERSONS KILLED OR INURED PER 1000 FULL-TIME WORKERS.					
	Chemical trades.	All in- dustries.	Chemical trades.	All in- dustries.	TOTAL NUMBER.		DEATHS.		PERMANENT DISABILITIES.	
					Chemical trades.	All in- dustries.	Chemical trades.	All in- dustries.	Chemical trades.	All in- dustries.
New York State, 1910 ¹	5,746	1,003,981	816	25,390	142	25.2	1.04	0.35	14.1	4.5
England, 1907 ²	109,488	3,401,851	904	43,478	8,26	12.7	0.45	0.34	.....	.....
France, 1905 ³	122,400	2,505,591	13,030	259,882	122.4	74.1	0.5	0.42	1.2	1.3
Germany, 1907 ⁴	206,263	8,604,155	13,034	516,366	63.19	60.01	0.75	0.77	9.13	3.92
									53.22	35.30

¹ N. Y. State Dept. of Labor Bull. Annual Reports of Factory Inspector, 1910 pp. 169; N. Y. State Census of Manufactures, 1910, pp. 5 to 6.² Reports of Chief Inspector of Factories and Workshops, 1907, pp. 310 to 312; Summary of Returns of Persons Employed in 1907 in Non-Textile Factories, etc., 1910, pp. 6 to 8 (British Home Office Accounts and Papers).³ Amtliche Nachrichten des Reichs-Versicherungsamts, 1910, 1. Beiheit, 1. Teil; Gewerbeunfallstatistik für das Jahr 1907, pp. 20 to 191.⁴ Rapports sur l'Application des Lois Réglementant le Travail en 1905, Direction du Ministère du Travail et de la Prévoyance sociale 1906, CXCI, pp. 476.

TABLE 3 — NATURE OF THE INJURIES IN THE CHEMICAL INDUSTRIES IN NEW YORK STATE AND IN ENGLAND AND GERMANY: PER CENT OF PERSONS KILLED OR INJURED.

STATE OR COUNTY. AND YEAR.	WOUNDS, CON- TUSIONS AND FRACTURES.	BURNS, SCALDS ACIDS, BURNS, ETC.	SUFFOCATION.	MISCEL- LANEOUS ACCIDENTS.
New York State, 1910 ¹	76.34	13	.....	12
England, 1911 ²	51. +	5.7	2.6	40.27
Germany, 1907 ³	85.87	11.92	.59	15

¹ N. Y. State Dept. of Labor Bull. (Reports of the Factory Inspector), 1910, pp. 169² Reports of the Chief Inspector of Factories and Workshops, 1907, pp. 310 to 312.³ Gewerbeunfallstatistik für das Jahr 1907, pp. 2 to 191.

From table No. 3 it is evident that the largest number of accidents due to burns occur in New York State and the least in England. This fact may be ascribed to the rigid laws in England requiring the covering and fencing of vats and pans containing acids or hot or corrosive liquids.

TABLE NO. 4 — CAUSES OF THE ACCIDENTS IN THE CHEMICAL INDUSTRIES AND IN ALL THE INDUSTRIES: GERMAN EXPERIENCE, 1907 and 1897.¹

ACCIDENTS CAUSED BY ENGINES, ELECTRIC CURRENTS, EXPLOSIVES, ETC.	INDUSTRY AND YEAR.			
	CHEMICAL.		ALL INDUSTRIES.	
	1907 Per Cent.	1897 Per Cent.	1907 Per Cent.	1897 Per Cent.
Motors, engines, etc.	0.93	1.19	0.64	0.95
Transmission apparatus, etc.	1.62	2.98	1.20	1.55
Working machinery, etc.	17.22	15.10	17.50	17.40
Elevator hoists.	3.29	2.28	5.03	4.86
Steam boilers, etc.	0.25	0.30	0.18	0.32
Electric currents.	0.15	.....	0.23	.40
Explosives.	2.11	4.57	0.64	0.95
Inflammable, hot or corrosive substances	14.47	15.59	3.53	3.35
Collapse, fall, etc., of objects	7.80	7.05	15.08	13.94
Falls from stairs, ladders, etc.	11.63	11.62	11.30	11.83
Loading and unloading.	15.90	14.50	14.02	13.76
Teaming, draying, etc.	5.94	7.25	5.63	6.37
Operation of railways.	5.35	5.36	9.71	7.84
Shipping and water transportation.	0.20	0.50	1.06	1.37
Animals, bite, kick, push, etc.	0.93	0.89	1.64	0.91
Tools, hand apparatus, etc.	3.19	2.68	4.10	3.57
Miscellaneous.	9.02	8.14	7.51	7.99

¹ Gewerbeunfallstatistik für das Jahr 1907, pp. 2 to 191.

Figures setting forth the causes of accidents in the chemical trades and in all the industries in New York State were not available. But since the machinery employed in the chemical factories in Germany are similar to our own, we can assume that

agents causing injury are the same. In the above table (Table No. 4), two things are worthy of notice:

(1) The accident rate in the chemical trades caused by the inflammable hot or corrosive substances is more than four times the accident rate due to the same substances in all the industries.

(2) The number of accidents due to explosives in the chemical trades is four times the number in all the industries.

The largest causes of accidents are due to unguarded machinery, open vats and pans, unguarded stairs, etc., and careless loading and unloading. (See Table 4.) These can be prevented to a great extent by providing and enforcing laws for the guarding of machinery, fencing, etc., of vats and pans, etc. (See English laws on chemical trades, this report, pp. —.)

TABLE 5 — CAUSES OF THE ACCIDENTS IN THE CHEMICAL INDUSTRIES AND IN ALL THE INDUSTRIES: GERMAN EXPERIENCE, 1897 and 1907.

CAUSES OF ACCIDENTS.	INDUSTRY AND YEAR.			
	CHEMICAL INDUSTRY.		ALL INDUSTRIES.	
	1907 Per Cent.	1897 Per Cent.	1907 Per Cent.	1897 Per Cent.
General hazards of trades.....	32.80	24.53	37.65	42.05
Faults of workmen.....	41.85	43.71	41.26	29.89
Faults of employer.....	12.88	16.98	12.06	1.68
Faults of both workmen and employer.....	3.42	5.97	0.91	4.66
Faults of fellow-workmen.....	7.24	8.81	5.94	4.28
Chance, etc.....	1.81	.....	2.18	1.31

It is evident from Table No. 5 that the largest number of accidents in the chemical trades, as well as in all the industries, can be ascribed mainly to the general hazards of trade and to carelessness, etc., of the workers.

TABLE NO. 6—ECONOMICAL LOSS AS A RESULT OF THE INJURIES TO WORKERS IN THE CHEMICAL TRADES:
GERMAN EXPERIENCE, 1897 TO 1907.¹

YEAR AND NUMBER OF CASES.	PER CENT. OF INJURED PERSONS WHOSE INJURIES RESULTED IN												
	Death.	Total per- manent dis- ability.	PARTIAL PERMANENT DISABILITY.				Total.	TEMPORARY DISABILITY.				Total.	
			WITH LOSS OF EARNING POWER OF					WITH LOSS OF EARNING POWER OF					
			Under 25%.	25 to 50%.	50 to 75%.	75 to 100%.		No loss.	Under 25%.	25 to 50%.	50 to 75%.		75 to 100%.
1896													
898 Cases													
1897	10 25	4 12	28 75	16 04	6 01	1 56	62 36	20 15	3 12	.....	.....	.....	23 27
1898	10 24	3 12	25 19	15 70	5 01	1 90	57 80	25 05	3 79	.....	.....	.....	28 84
1899	10 36	2 34	34 74	14 25	5 12	2 12	56 23	30 40	.67	.....	.....	.....	31 07
1900	10 47	2 12	34 19	13 59	5 34	2 00	55 12	32 18	.11	.....	.....	.....	32 29
1904													
1,535 Cases													
1905	7 10	.91	44 76	15 24	5 73	2 02	67 75	22 80	.....	.....	.....	.....	24 24
1906	7 56	.85	37 85	13 29	5 08	1 69	57 91	33 68	.....	.....	.....	.....	33 68
1907	7 62	.88	33 75	12 57	4 89	1 43	52 64	38 89	.....	.....	.....	.....	38 89
1908	7 88	.78	32 31	11 53	4 37	.04	49 25	42 09	.....	.....	.....	.....	42 09

¹ Amtliche Nachrichten Das Reiches-Versicherungsamts, 1910, 1 Beiheft, 1 Teil; Gewebernfallstatistik für das Jahr 1907, pp. 2 to 191.

TABLE NO. 7—INCREASE OF THE GENERAL ACCIDENT RATE IN THE CHEMICAL INDUSTRIES: GERMAN EXPERIENCE, 1897 TO 1907.¹

NUMBER OF PERSONS KILLED OR PERMANENTLY INJURED PER 1000 FULL-TIME IN THE CHEMICAL INDUSTRIES.										
1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907
7.76	7.09	7.79	8.39	9.04	7.85	7.98	8.65	8.71	9.24	9.88

¹ Amtliche Nachrichten des Reichs-Versicherungsamts, 1910, 1 Beiheft; 1 Teil; Gewerbeunfallstatistik für das Jahr 1907, pp. 2-191.

TABLE 8—EFFECT OF THE NUMBER OF HOURS OF LABOR UPON THE ACCIDENT RATE: GERMAN EXPERIENCE, 1897 TO 1907—
PER CENT OF PERSONS REPORTED INJURED IN THE SPECIFIED PERIOD.

INDUSTRIES AND CASES COMPENSATED.	ANTEMERIDIAN.					POSTMERIDIAN.			MONDAY, A. M.		SATURDAY, P. M.	
	12-3.	3-6.	6-9.	9-12.		12-3.	3-6.	6-9.	6-9.	9-12.	3-6.	6-9.
<i>Grand Total Cases:</i>												
1907, 81,248.....	1.93	2.55	13.87	28.42		13.81	26.32	9.25	2.56	4.78	4.48	1.45
1897, 45,971.....	1.37	2.26	13.79	29.52		12.67	26.39	10.36	2.34	4.84	4.69	1.55
<i>Chemicals:</i>												
1907, 2,038 cases.....	3.76	3.06	14.35	28.00		13.65	22.59	8.24	2.07	4.83	3.45	.92
1897, 1,007 cases.....	4.79	.60	2.40	14.97		20.96	17.37	28.14	1.68	4.47	4.47	1.68

Gewerbeunfallstatistik für das Jahr 1907, pp. 2-191.

SUMMARY

The workers in the chemical trades are subject to dangers peculiar to these industries. Chief among these are poisonous substances handled by the workers throughout the workday; open and unfenced vats and pans containing acids or hot and corrosive liquids; abnormal physical conditions such as great heat or cold, variable atmospheric pressure and humidity, etc.; dangerous processes, etc. Due to the dangers peculiar to the chemical trades laws have been passed in the various European countries as well as in some of the States of the United States regulating the chemical industries.

In New York State there are no special laws regulating the chemical trades, due to the laxity of the law as well as the ignorance of the workers, the accident rate in New York State is much greater than in England, Germany and France. The number of fatalities and permanent injuries per 1,000 workers in the chemical trades in New York State exceeds by far the number in England, France and Germany.¹ These injuries entail a great economic loss to the workers, their widows, etc., and through them to the State.

An examination of Table 4 will reveal the fact that a large number of the accidents in the chemical industries can be eliminated. Among these must be mentioned proper fencing, etc., of vats and pans, the carrying away of dusts and fumes by means of exhausts, etc., and the proper regulation of those industries which are dangerous.

From Table 7 it is obvious that the accident rate in the chemical industries as well as in all the industries is increasing. Hence it is obvious that this question of accident rate is not one that will be settled with the institution of more modern machinery but is one that demands immediate attention.

It is also of interest to note the effect of long hours on the accident rate (Table 8).

(1) See Table 1.

APPENDIX III

THE FIRE HAZARD

BY

JAMES P. WHISKEMAN, *C. E., Advisory Expert to Commission
on Fire Prevention and Building Construction.*



APPENDIX III

THE FIRE HAZARD.

The study of "fire prevention" in factory buildings is one of paramount importance in a proper solution of the factory problems presented to your commission.

The annual fire loss in this country has reached tremendous proportions and we are keenly alive to the fact that the situation has not been heretofore attacked in the proper way.

It is not sufficient to rely on fire departments, no matter how efficient they may be; nor is the solution of the problem to be found in fire insurance even when most rigorously supervised and effectively regulated.

In our large cities, as well as in small communities, we build fire-proof buildings to cope with the fire problem, we likewise limit the area, to the outlying districts, in which frame buildings may be built; yet year after year statistics show that the per cent loss from fires grows steadily larger and we have good reason to be alarmed at the situation that confronts us.

The European nations experience no such losses as we do and a study of how they attack the problem may help us in a better understanding of the subject of "fire prevention."

The United States Geological Survey conducted an inquiry into the fire losses in the United States and European countries, from which the following statistics are taken:

RESULTS OF THE INQUIRY.

The Fire Waste in the United States:

The 2,976 cities and villages from which reports were received, with a population aggregating 34,102,453, reported a fire loss of \$86,476,029 a per capita loss of \$2.54; the postmasters in rural districts reported a total loss of \$3,519,769, a per capita loss of \$2.49, making a total loss of \$89,995,798, a per capita loss for cities, villages and rural districts from which returns were received of \$2.51, an index sum that would give an aggregate loss for the United States in 1907 of \$215,084,709. The significance of these figures is realized when it is known that the average per capita loss in the cities of the six leading nations of Europe amounts to 33 cents.

The total loss on buildings in the United States was \$109,156,894 and on contents \$105,927,815. There were fires in 36,140 brick, iron and stone buildings, with a loss of \$31,092,687 on the buildings and \$37,332,580 on the contents and in 129,117 frame buildings, with a loss of \$78,064,207 on the buildings and \$68,595,235 on the contents. In cities and villages with a population of 1,000 or more, there were 6,324 fires that extended beyond the building of origin, with a total exposure loss of \$13,913,694. The loss on fires that were confined to the building of origin in the cities and villages amounted to \$93,179,589.

In addition to the great loss of property, 1,449 persons lost their lives in fires during the year and 5,654 were injured.

In discussing this waste, Mr. Charles Whiting Baker, editor of the Engineering News, New York, in an address before the national engineering societies on "Conservation of Natural Resources," March 24, 1909, said:

"The buildings consumed, if placed on lots of 65 feet frontage, would line both sides of a street extended from New York to Chicago. A person journeying along this street of desolation would pass in every thousand feet a ruin from which an injured person was taken. At every three-quarters of a mile in this journey he would encounter the charred remains of a human being who had been burned to death."

The fire losses are summarized in Table 1.

TABLE 1.
FIRE LOSSES IN THE UNITED STATES FOR 1907.
[Statistics Gathered by the United States Geological Survey.]

	Total.	Urban.	Rural.
Total fire loss	\$215,084,709	\$107,093,283	\$107,991,426
Buildings.....	109,156,894	50,173,625	58,983,269
& Contents.....	105,927,815	56,919,558	49,008,157
Brick, etc., buildings	\$68,425,267	\$48,908,744	\$19,516,523
Buildings.....	31,092,687	19,816,474	11,276,213
Contents.....	37,332,580	29,092,270	8,240,310
Frame buildings	\$146,659,442	\$58,184,539	\$88,474,903
Buildings.....	78,064,207	30,357,151	47,707,056
Contents.....	68,595,235	27,827,388	40,767,847
Number of fires	165,257	105,406	59,851
Number of fires in brick, etc., buildings.....	36,140	25,297	10,843
Number of fires in frame buildings.....	129,117	80,109	49,008
Loss per capita	2.51	2.54	2.49

The total loss from fire in the United States during 1907, \$215,084,709, represents a waste of nearly \$600,000 for every day of the year, of \$25,000 for every hour of the day. The term "waste" is used because the fire loss is absolutely irretrievable and constitutes a tremendous drain upon the natural resources of the country. The insurance on a burned building does not bring back the property that was destroyed; it simply equalizes the loss between all others whose property is insured.

The fire waste for the last thirty-three years, according to the National Board of Fire Underwriters, reached the tremendous total of \$4,484,326,831. Fearful as it is to contemplate this great destruction of the natural resources of this country, the situation becomes more appalling when it is realized that this waste is increasing by leaps and bounds with each succeeding year. The National Board of Fire Underwriters gives the following estimates of the fire waste for the last thirty-three years:

TABLE 2.
ANNUAL FIRE LOSSES IN THE U. S. FOR 33 YEARS, 1875-1907.
[Compiled by the National Board of Fire Underwriters.]

Year.	Loss.	Year.	Loss.	Year.	Loss.
1875.....	\$78,102,285	1886.....	\$104,924,750	1897.....	\$116,354,575
1876.....	64,630,600	1887.....	120,283,055	1898.....	130,593,905
1877.....	68,265,800	1888.....	110,885,665	1899.....	153,597,830
1878.....	64,315,900	1889.....	123,046,833	1900.....	160,929,805
1879.....	77,703,700	1890.....	108,993,792	1901.....	165,817,810
1880.....	74,643,400	1891.....	143,764,967	1902.....	161,078,040
1881.....	81,280,900	1892.....	151,516,098	1903.....	145,302,155
1882.....	84,505,024	1893.....	167,544,370	1904.....	229,198,050
1883.....	100,149,228	1894.....	140,006,484	1905.....	165,221,650
1884.....	110,008,611	1895.....	142,110,233	1906.....	518,611,800
1885.....	102,818,796	1896.....	118,737,420	1907.....	199,383,300

In the last thirty-three years, therefore, as shown by Table 2, the total value of property destroyed by fire amounted to \$4,484,000,000, and the figures obtained in this inquiry show that it is reasonable to assume that fully as much money was spent in fire protection, making a total of almost \$9,000,000,000 in thirty-three years.

ANALYSIS OF THE FIRE LOSSES IN THE UNITED STATES.

Losses on Frame and Brick Buildings in City and Country:

In an analysis of the fire loss the fact stands out prominently that much of it is due to fires that extend beyond the limit of the

buildings in which they started. It is impossible from the figures obtained during the inquiry to give any definite statement as to the amount of the losses due to exposure, but some years ago prominent underwriters estimated at least 27 per cent of the fire loss comes from fires that extend beyond the buildings in which they originate. These losses are undoubtedly due to the inflammable construction of buildings, for in Europe, where fire-proof construction prevails, there is no such loss from this source, fires being more readily confined to the buildings in which they are started. It is even more notable that only \$68,000,000 on the loss in the United States was on buildings of brick, concrete, stone, and other slow-burning construction material, while double that amount, or about \$148,000,000, was on frame buildings.

It will be seen from Table 1, that the loss is rather evenly divided between the urban and the rural population, the total loss in the cities and villages amounting to \$107,093,283 and in the rural districts to \$107,991,426. The total urban population is estimated at 42,160,710 and the rural at 43,162,051. The big losses in the cities and villages are not surprising, for in these are located many large buildings filled with millions of dollars' worth of property. These buildings are subject to an additional risk because they adjoin or are near one another. In the rural districts the buildings are widely separated and contain property that does not compare in value with that in the cities, yet the losses are as great in these districts. The only conclusion that can be drawn from this condition is that the remarkable efficiency of the fire departments of the cities prevents a much greater loss than really occurs and that the absence of a fire-fighting apparatus in the rural districts permits the loss in fires to be total.

This fact is plainly shown in the total building loss of the country, the fire departments keeping the loss in the cities and villages down to \$50,173,625, while fires in the rural districts consumed buildings valued at \$58,983,269.

The contents loss in the cities and villages was \$56,919,658 as against \$49,008,157 in the rural districts, which again proves the contention in spite of the great loss in the rural districts, as it is well known that the value of the property in the city buildings is many times greater than that in buildings in rural communities.

The losses on brick, stone and steel buildings in the cities and villages amounted to \$19,816,474 and on contents to \$29,092,270; in the rural districts the losses on these buildings were \$11,276,213 and on the contents \$8,240,310. The much heavier losses in the cities and villages on the brick, stone and steel buildings are undoubtedly due to the few buildings of this character in the rural districts in comparison to the number in the cities.

The losses on frame buildings in the cities and villages amounted to \$30,357,151 and on the contents to \$27,827,388; in the farming communities the losses on these buildings reached a total of \$47,707,056 and on the contents \$40,767,847. This once more tells of the efficiency of the fire departments in coping with the flames in cities and villages and the utter lack of fire protection in the rural districts.

Losses by Conflagrations:

Since the year 1866 the losses by conflagrations in the United States have amounted to \$936,551,135 according to tables prepared by the National Board of Fire Underwriters. By "conflagrations" is meant all fires involving a loss of half a million or more dollars. According to the same authority the conflagrations of 1907 cost the United States \$18,475,000. The loss by conflagration in 1908 exceeded that of the preceding year by a large sum, one conflagration alone, that at Chelsea, Mass., on April 12 and 13, involving an insurance loss of \$8,846, 879, as reported by the underwriting companies to the Massachusetts Insurance Commissioner.

The notable conflagrations of the United States have been those at Chicago in 1871; Boston, 1872; Baltimore, 1904, and San Francisco on April 18th, 1906. The earthquake and fire at San Francisco resulted in a total property loss of \$350,000,000, exceeding in amount that of any previous similar disaster in the history of the world.

The fact that no other country suffers such enormous conflagration losses has led to a general investigation of the causes by fire underwriters, fire marshals, officials of States and municipalities and students of economic conditions, and the conclusion reached is that the great loss is due mainly to poor and defective construction of buildings and equipment. The investigation has

further disclosed the probability that an increase in the number and severity of conflagrations may be expected until there is a decided improvement in methods of construction.

The danger of conflagration is present in every city and village of the United States, and with it the possibility of large loss of life. The most efficient fire department in the country is powerless when once a fire gets under considerable headway in a locality where bad construction prevails.

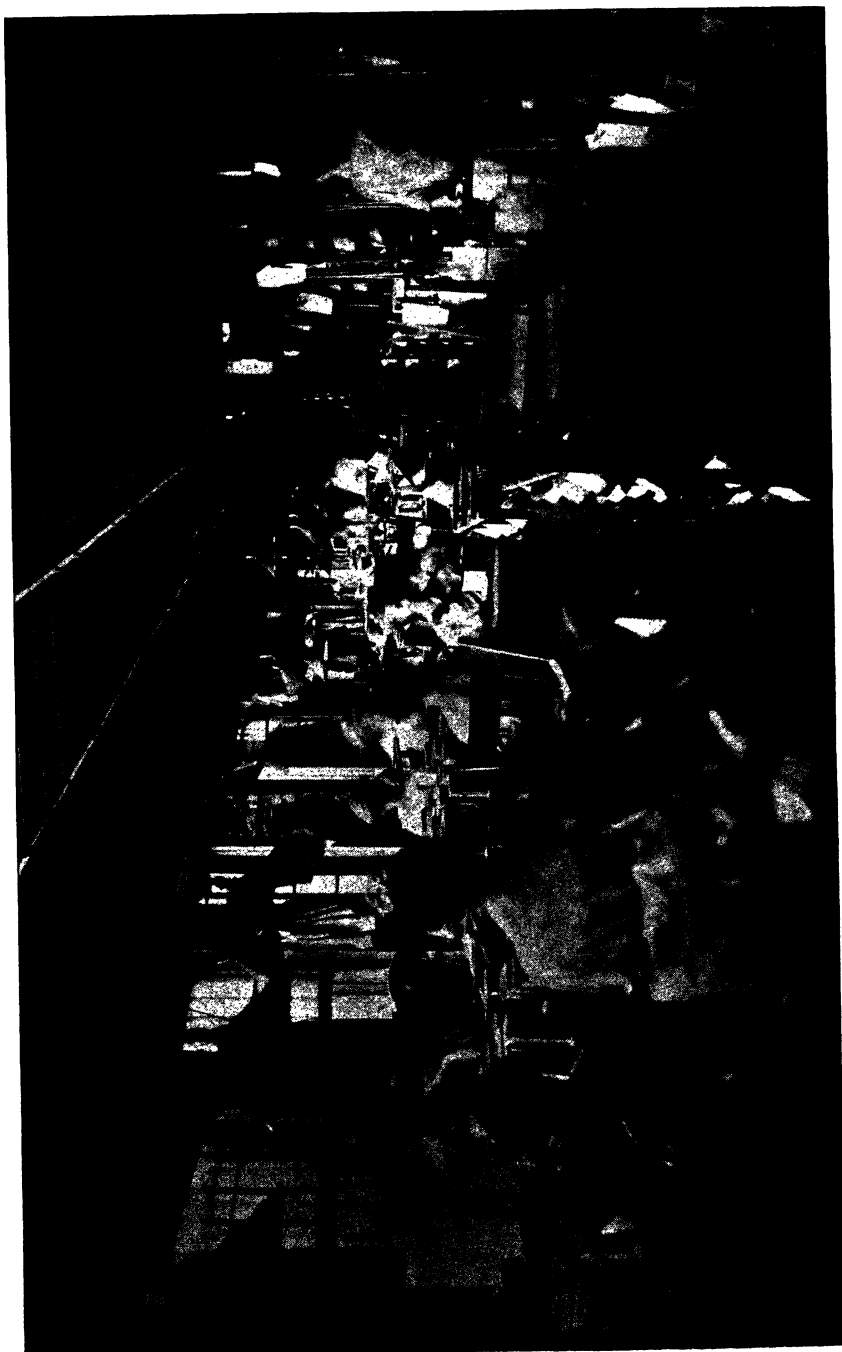
The October, 1908, quarterly of the National Fire Protection Association says:

The average American city is full of fire traps. Buildings of great areas without fire cut-offs, with large floor openings, with unprotected windows, and with very combustible contents are too numerous to prove the exception to any rule. These are conflagration breeders. Fire travels through them rapidly and under certain conditions can get beyond even the best fire departments, and, sweeping through the unprotected windows of surrounding buildings, will soon cause a conflagration.

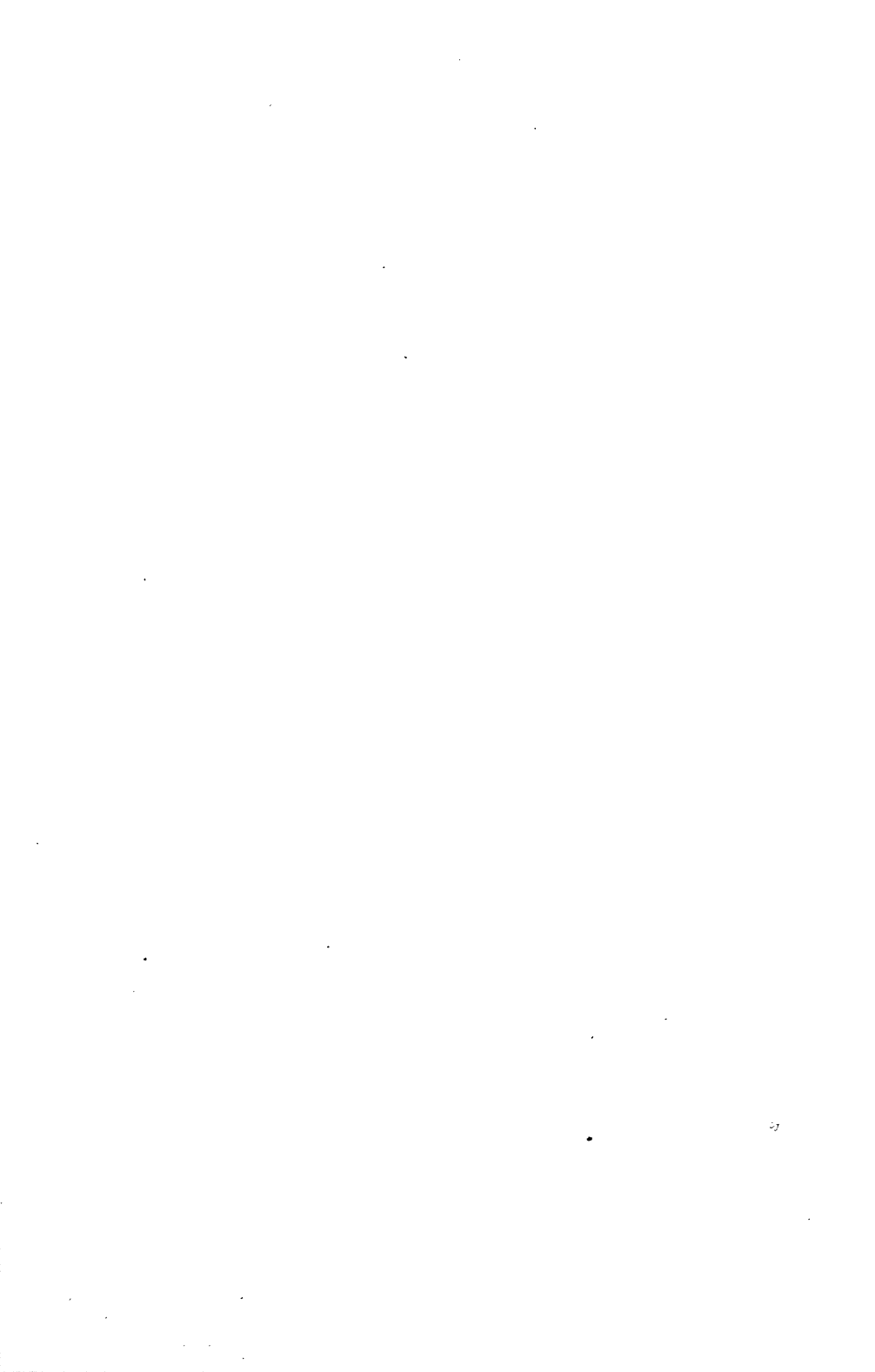
Lives Lost:

During the year 1907, according to information gathered by the United States Geological Survey, fires caused the death of 1,449 persons and the injury of 5,654. These figures are incomplete and perhaps do not represent more than half the persons who were victims of fires. Many fire chiefs of large cities failed to report any deaths because such were not properly included in their annual reports. It is safe to assume that with the fire losses of the United States from five to seven times as great as those in Europe, the number of persons killed and injured here is from five to seven times greater than in Europe. The cause of this again, in many instances, is faulty construction of buildings and inappreciation on the part of cities of the responsibility to safeguard the lives of their citizens, or ignorance of what is demanded to protect against fire.

The fire at the Iroquois Theatre in Chicago, December 30th, 1903, in which 600 persons lost their lives, was a terrible object lesson, yet it was not sufficient to stop these disasters. On January 13, 1908, fire in an opera house at Boyertown, Pa., cost the lives of nearly 200 women and children. I was in this building



HAT MANUFACTURING COMPANY, VARK STREET, YONKERS, N. Y.
Finishing room where large numbers of girls are employed.— Overcrowded and very dangerous in case of fire.



some years ago, and would say that it was a typical construction for opera houses and meeting places in the smaller communities. Two months later, March 4, 1908, 165 children were burned to death in a school house at Collinwood, Ohio. I was called upon to examine a frame high school building of much similar construction in a nearby community and reported the same to be a fire trap of the worst kind. Nothing has so far come of my report. One of the directors refused to send his children to the school. In the Asch Building or Triangle Shirt-waist Factory fire in New York city on March 25, 1911, 145 persons lost their lives.

If the buildings destroyed had been properly constructed and equipped such loss of life would have been impossible.

CAUSES OF THE FIRE WASTE IN THE UNITED STATES.

Frame Buildings:

The great fire waste in the United States is undoubtedly due to the predominance of frame buildings. In most European cities frame buildings are positively prohibited within the limits of municipalities, and but few are erected in the rural districts, owing to the scarcity and the high price of timber. In the United States the conditions have been exactly reversed. Lumber, at least until recently, has been the cheaper material, besides being more easily worked than brick, stone or steel. The result has been that the greater number of the homes of the country and many factory buildings, warehouses, etc., have been made out of lumber.

Of the total losses sustained in the United States in 1907, more than two-thirds was due to the construction of frame buildings. The exact losses were \$146,695,442 in frame buildings and \$68,425,267 in brick, stone and steel buildings, as shown by Table 3.

TABLE 3.

FIRE LOSSES IN THE U. S. IN 1907 IN BRICK, IRON AND STONE BUILDINGS, AS COMPARED WITH THOSE IN FRAME BUILDINGS.

[Statistics Gathered by the U. S. Geological Survey.]

Number fires in frame buildings.....	129,117
Number fires in brick, iron and stone buildings.....	36,140

Construction and Equipment:

Although the prevailing use of lumber as a material of construction is one cause of the great fire waste of the United States, there is another cause back of this: faulty construction and equipment.

The capital invested for fire protection and the annual loss and expense on account of fire in the United States in 1907 is shown in Table 4.

TABLE 4.

CAPITAL INVESTED FOR FIRE PROTECTION AND ANNUAL LOSS AND EXPENSE ON ACCOUNT OF FIRE IN THE UNITED STATES, 1907.

	Investment in Construction and Equipment.	Annual Loss and Expense.
FIRE LOSS.		
Total fire loss.....		\$215,084,709
FIRE PROTECTION.		
<i>Insurance.</i>		
Amount of fire premiums paid above amount of losses paid.....		a145,604,362
<i>Waterworks.</i>		
Total cost of waterworks chargeable to fire service.....	b\$245,671,676	
Source of water supply.....	\$66,482,220	
Distributing system (2,016,927 tons of metal).....	127,236,668	
Hydrants (350,152).....	29,761,400	
Separate high-pressure fire service....	22,191,388	
Total annual expense of waterworks chargeable to fire service.....		28,856,235
Depreciation and taxes.....	10,563,881	
Interest charge.....	c9,826,867	
Maintenance.....	8,465,487	
FIRE DEPARTMENTS.		
Total cost of fire departments.....	107,063,524	
Total annual expense of fire departments.....		48,940,845
Depreciation and taxes.....	\$4,603,731	
Interest charge.....	d4,282,540	
Maintenance.....	40,054,574	
PRIVATE FIRE PROTECTION.		
Total cost of private fire extinguishers, automatic sprinklers, etc.....	50,000,000	
Total annual expense of private fire protection (e).....		18,000,000
	\$402,735,200	\$456,486,151

a The amount paid by insurance companies on account of fire loss was \$114,164,469 and the amount received by them in premiums was \$259,768,831.

b This is 22 per cent. of the total cost of water systems, domestic and fire service combined.

c \$245,671,676, cost of waterworks chargeable to fire service, capitalized at 4 per cent., is equal to an annual charge of \$9,826,867.

d \$107,063,524, cost of fire departments, capitalized at 4 per cent., is equal to an annual charge of \$4,282,540.

e Interest on investment, cost of watchman, etc.

Fire Waste in European Cities:

The inquiry covered not only the cost of fires in the United States, but also the general cost in Europe. In 1905 the Bureau of Manufactures of the Department of Commerce and Labor sent letters of instruction to all the principal United States Consular officers in Europe, requesting information concerning the fire losses in European cities; also a statement regarding the fire insurance practice in those cities. Unfortunately, the statistics gathered were not all for the same year, some cities reporting for 1901, others for 1903 and still others for 1904, and a few failing to make any report. It is stated, however, that there is but little variation from year to year in the fire losses of the European cities, and for this reason the figures were tabulated.

Cities of Austria, Belgium, France, Norway, Russia, Switzerland and the United Kingdom, with a reported population of 19,913,816 had a loss of but \$9,582,340 — a per capita of 48 cents. Russia had the highest loss, \$3,100,823, in a population of 2,673,427, a per capita loss of \$1.16. If the United States had Europe's per capita of 48 cents in a total population estimated by the Census Bureau for 1907 as 85,532,761, the total fire waste in this country for the year would amount to \$41,055,725, a saving of natural resources to the extent of \$174,028,984. With the maximum per capita loss in Europe \$1.16 (in Russia), the fire waste in the United States would amount to \$99,218,002 or \$116,314,759 less than it did.

Frame Buildings:

The principal reasons for the great difference between the amount of fire waste in the United States and Europe is that there are but few frame buildings in Europe and practically none in the great cities.

Consul Hossfeld, of Trieste, Austria-Hungary, in his official report to the State Department on the fire losses in the city he represents, said:

The laws of Trieste and its territory prohibit the construction of wooden buildings. Only sheds and buildings of a temporary nature can be constructed of wood, such as are intended to serve

as a shelter for workmen or for the storage of materials while permanent buildings are being constructed.

Consul Harold S. Van Buren, of Nice, France, wrote:

There may be a few sheds of wood or detached stables of a temporary character, but not sufficient to form a portion of the statistics.

Consul John C. Covert, of Lyons, stated:

An official in the office of the mayor informed me that there are no wooden buildings in the city except a few odd sheds, constructed without permission and permitted to remain, as they are in open fields and of no danger, being some distance from other buildings.

Consul-General Frank H. Mason, wrote concerning Berlin, Germany:

The comparative immunity of Berlin from disastrous fires results not from the efficiency of its fire department — although it does promptly and well what work it has to do — but from the absence of wooden houses and the solid, careful construction of all kinds of stone and brick buildings under the rigid scrutiny of the building police.

Other consuls invariably report:

“There are no other wooden buildings in the city.”

The following statement is made in special Consular Reports, Volume 38, Bureau of Manufacturers, Department of Commerce and Labor, in discussing fire insurance in foreign countries:

In Europe the fire insurance laws are remarkable, chiefly because they compel insurance in some countries, while in all cities they prevent great loss by insisting on the erection of only stone and brick buildings. The fire department systems are ridiculously inadequate as compared with those of American cities, yet the net results are better. French law compels insurance against fire, not only for the benefit of the owner, but for his neighbor.

In Germany building insurance is compulsory, and in some kingdoms it is a government monopoly. Russia has an elaborate system of central and local government insurance and compels the insurance of all buildings. In some of the Cantons of Switzerland, insurance against loss by fire is compulsory.

The fire loss in the cities of some of the countries of Europe is shown in Table 5.

TABLE 5.
FIRE LOSSES IN THE CITIES OF EUROPE.
[Statistics gathered by the Bureau of Manufactures.]

COUNTRY.	Population.	Fire loss.	Loss per capita.
Austria (a).....	193,387	\$72,355	\$0.37
Russia (a).....	2,673,427	3,100,823	1.16
United Kingdom (a).....	4,319,816	1,795,750	.42
Belgium (b).....	312,987	178,766	.57
Germany (b).....	7,446,447	1,832,402	.25
Norway (c).....	222,373	207,000	.93
Switzerland (c).....	715,712	192,500	.27
France (d).....	4,029,116	2,202,744	.55
	19,913,265	9,582,340	.48

a Losses for 1904.

b Some cities of country report for 1903; others for 1904.

c Losses for 1903.

d France reports for 1904 with exception of city of Lyons, which is for 1901.

Some time after these statistics were prepared the National Board of Fire Underwriters obtained permission from the State Department to send their own queries to the Consular officers in Europe, with the result that figures showing the fire losses in six countries were obtained, some of them for a period of several years. These figures showed the surprisingly low per capita loss of 33 cents for the six countries and are given in Table 6.

TABLE 6.
FIRE LOSSES IN SIX EUROPEAN CITIES.
[Statistics gathered by National Board of Fire Underwriters.]

COUNTRY.	Years.	Annual average.	Population. 1901.	Loss per capita.
Austria.....	1898-1902	7,601,389	26,150,597	\$0.29
Denmark.....	1901	660,924	2,588,919	.26
France.....	1900-1904	11,699,275	38,595,500	.30
Germany.....	1902	27,655,600	56,367,178	.49
Italy.....	1901-1904	4,112,725	32,449,754	.12
Switzerland.....	1901-1903	999,364	3,325,023	.30

Special Consular Reports — 1905:

The following report from Southampton is from Consul Albert W. Swalm:

Southampton, the chief southern seaport of England, has a population of 115,000 and covers an area of 20 square miles.

It is a well built town generally. Its buildings are almost wholly of brick or stone, and wooden construction on residential lines is hardly known. It should be noted that the construction of the residences lends itself largely to safety from fires, there being only 65 alarms during the year ended March 31, 1905, the largest number by 10 for the past decade. The losses for the year do not exceed \$12,000. Losses are almost wholly confined to the building in which the fire originated. The insurance fully covers the loss generally.

Examination of the detailed report of the superintendent of the fire brigade herewith will give a flood of information to the practical fireman, both on insurance and fighting lines. It may be noted that, because of a long time enforced individual responsibility in the matter of conflagration, the accidentency of fire has been brought down to the lowest limit of average. Thus should a man permit the chimney of his house to become foul with soot and "fired" he would be fined five shillings (\$1.20). The storing of any waste is regulated and the by-laws are made to be enforced against all and without fear or favor. Carefulness has grown into a steady habit. Attention is directed to Page 4 of the Superintendent's report, showing the charges made for attendance at fires on the part of the brigade and outfit. These charges are paid by the persons whose property may be the cause of the call. This custom is common in the south of England.

CONDITIONS IN OTHER CITIES.

Fire Resisting Construction in European Countries:

Bradford: Consul Erastus S. Day submits the following statistics for the City of Bradford:

There were no serious conflagrations in this district owing, in a large degree, to the material used in the construction of the buildings. With a few exceptions they are composed of stone, lined with brick and the more modern large structures are made fireproof.

The population of Bradford is 284,122; area 36 square miles. Number of alarms in 1904: Fire alarms 65, sprinkler systems 12, private telephones 3, National Telephone Exchange 2, total 85.

The number of fires from various causes was in stone and brick buildings 85, brick buildings 7, wooden buildings 5, corrugated iron buildings 1, other than building fires 10, total 108.

The number of fires confined in the place of origin was 107; extending to adjoining buildings 1, confined on the floor on which they originated 99. The total loss (insured and uninsured) was \$84,395. Losses on buildings and contents in which the fires originated (direct losses) \$84,152. Losses on buildings and contents in which the fire did not originate (exposure losses) \$243.

Bristol: Consul Lorin H. Lathrop submits the following for the City of Bristol:

The population of the City of Bristol is 358,000; area 17,004 acres; number of brick and stone buildings 60,000. There are no permanent wooden buildings but there are 120 wood and iron structures, the majority of which are to be pulled down, by agreement, 3 years hence.

The number of fire alarm calls in the year 1904 was 488, an increase over the preceding year of 37. Of these 19 were false alarms. The number of fires in brick and stone buildings was 469. There were no fires in wooden buildings, nor were there any other than building fires. The number of fires confined to buildings and places of origin was 469. None extended to or beyond adjoining buildings. Three hundred and fourteen of the alarms were in part for chimneys only and these burned nothing but the accumulated soot. It may be said that the actual fires in 1904 numbered only 155, and that none of these was of a serious nature. Official reports do not state what number of fires were confined to the floor on which they originated, but nearly all were as a matter of fact.

Derby: Consul F. W. Mahin, of Nottingham, writes of Derby:

The population is 114,848, area $8\frac{1}{4}$ square miles; number of brick and stone buildings about 29,000; wooden buildings very few (none used for dwellings or business). Number of fire alarms, 1904, was 90, one being false. All fires were in brick or stone buildings; 50 were only chimney blazes.

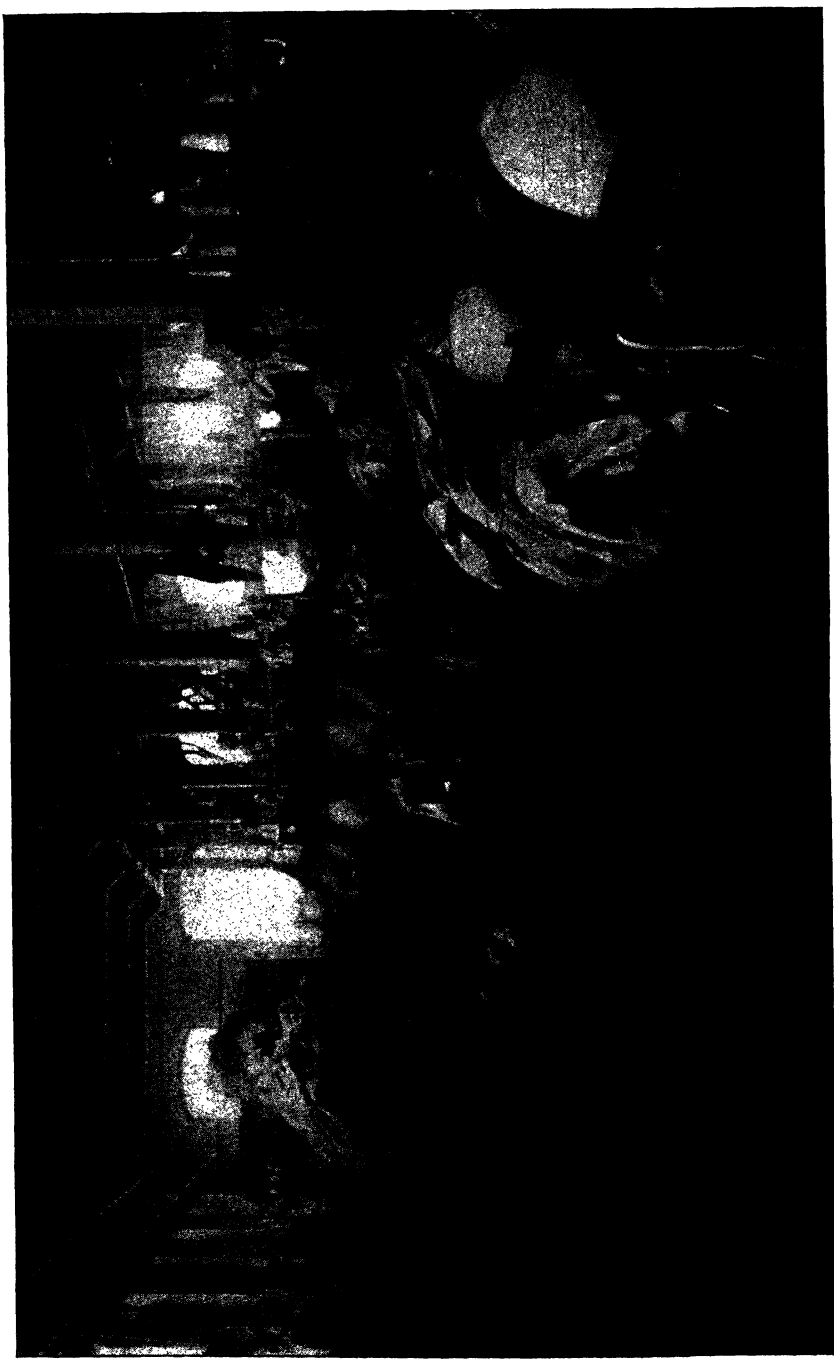
Leeds: Consul L. H. Dexter says that the estimated population of Leeds is 450,000; area 33 square miles; number of brick and stone buildings 100,000; fire alarms in 1904, 302; false

alarms 7; fires in brick or stone buildings 22; confined to place in which they originated 71. The losses amounted to \$245,000. Of the 295 fires, 113 were in buildings that were insured. There are a few wooden buildings in Leeds and they are used as workshops or outhouses.

Leicester: Consul F. W. Mahin, of Nottingham, writes of Leicester: The population is 225,000; area $13\frac{1}{4}$ square miles, number of buildings unknown; all of brick and stone, except a few wooden outbuildings. The number of fire alarms in 1904 was 167, of which 10 were false; 150 fires were in brick or stone buildings and 7 other than building fires. All were confined to place of origin, and 6 to the floor where originating. The total loss to insurance companies was \$13,071, the lowest on record in the town. Uninsured loss was unknown.

Newcastle-upon-Tyne: Consul H. W. Metcalf writes: The population of Newcastle-upon-Tyne is 246,995; area $13\frac{1}{2}$ square miles. The number of alarms during the year of 1904 was 171, of which 25 were false. The number of fires in brick and stone buildings 136, wooden buildings 2; other than building fires 8; total 146; fires confined in building in place of origin 144; extending to adjoining buildings only 1; beyond adjoining buildings 1. Fires confined on floors on which they originated 144; losses on buildings and contents in which the fires originated (direct losses) \$50,466. Losses on buildings and contents in which the fire did not originate (exposure losses) \$204.

Nottingham: Concerning fire insurance in Nottingham district, Consul F. W. Mahin writes: The city of Nottingham contained a population of 239,753 according to the census of 1901. Its present estimated population is 250,000. The area of the city is 17 square miles. The number of brick and stone buildings is not known and there are practically no wooden buildings except some small antiques. The number of fire alarms during the year 1904 was 181, of which 10 were false. The number of fires in brick and stone buildings was 148; in wooden buildings 7, and other than building fires 16. Only two of these fires extended to adjoining buildings and none to buildings beyond adjoining buildings. No record was made of fires confined to the floors on which they originated. The total loss on buildings contents was



KNITTING MILLS, WASHINGTON STREET, HUDSON, N. Y.
The Finishing Room.—Shows overcrowded condition; great boxes of finished goods obstruct the aisles of exits.



\$214,246. This includes exposure losses in buildings adjoining those in which the fire originated, separate records thereof not being kept.

Sheffield: Consul C. M. Daniels writes: The population of Sheffield is 409,070, according to the census taken in 1901; estimated population at the end of 1903, 426,686; area 37 square miles. There are practically no wooden buildings in Sheffield. The number of alarms in 1904 was 275, of which 21 were false. The number of fires in brick and stone buildings was 254 of the total, only 12 occurred in other than brick or stone buildings. All fires were confined to the place of origin. The total loss (insured and uninsured) was \$25,989. All losses were direct.

Individual Responsibility for Fires in France:

Under all American efforts to check the fire waste now lies the growing conviction that no real progress can be made until the man who has a fire ceases to be regarded as an unfortunate and is looked upon as a public offender. Individual legal responsibility for loss by fire seems a drastic corrective to the ordinary American citizen who believes his neighbors can look out for themselves, no matter how unneighborly his own acts may be, but such restraint must undoubtedly be the avenue through which our absurd number of fires may be curtailed. If every down-town building occupant in New York were financially answerable for any loss to his neighbors caused by fire in his property, there would be a stampede for the protection of window openings, and the conflagration hazard of the metropolis would quickly disappear.

There is nothing revolutionary in the idea that an individual should be responsible to others for his acts. In other circumstances such phrases come from American lips with sufficient glibness. It is in the application of the principal to fire that it seems revolutionary.

It does not rest with Americans, however, to make primary application of this principal in the matter indicated, for the French have long so applied it with admirable results. There are no special laws in France relating to fire inquests, yet an inquiry by the police is made into every fire in cities and towns, and in the country districts by the gendarmerie.

The responsibility of a man for fire damage to his neighbors lies not in any special enactment, but in the interpretation of two short sections of the Code Napoleon, which code of laws prevails especially in France and Belgium, and which forms the basis for the modern law in most Latin countries.

The sections referred to are as follows:

Article 1382: Every person is responsible and liable for any acts of his by which any other person has or may have sustained any loss, damage or injury.

Article 1383: Every person is responsible for loss, damage or injury caused by his own act, carelessness or negligence.

The responsibility, as it relates to fire, is called in France the "Recours des voisins" or neighbors' risk. It is universal and applies to landlord and tenant alike. Applied to fire, these articles mean that if a fire starts in any premises through gross carelessness or culpable fault, all damage done to neighboring property by that fire must be made good. There is no limit to this liability, which may extend to an entire block in case of conflagration. The only point in the application of the law by which such offender may escape is that a burden of proof lies with the neighbor making claim. The latter must be able to prove, before he can recover damages, that the fire was directly due to gross carelessness, culpable neglect or mischievous intent.

There are two articles in the French code which apply specifically to fires. These undoubtedly originated with the landlord. These acts are as follows:

Article 1733: The tenant is responsible for a fire on his premises unless he can prove that the fire was caused by something beyond his control, by some fault in building or that the fire was communicated by a neighboring building.

Article 1734: If there are a number of tenants all are alike responsible unless they can prove that the fire caught in the apartment occupied by one of them, in which case, he alone is responsible or unless some of them prove that the fire did not begin in their apartment in which case, they are not responsible.

The responsibility here indicated is called the "risque locatif." The tenant having a fire is responsible to the landlord for loss of rent, not only his own rent, but that of other tenants.

The presumption always is that the fire was caused by the act or neglect of the tenant and the onus of proof rests upon him to show that it originated from some structural defect or from some cause beyond his control, before the landlord can be held responsible. A tenant, therefore, must suffer not only the loss occasioned by some defect in the building or from some other cause over which he had no control, in which event the entire loss, both on building and contents, and for damage done to neighbors' property falls upon the owner of the buildings in which the fire originated.

While it is impossible that such laws as obtain in France will receive American enactment in the near future, it is yet certain that the growing popularity of the office of Fire Marshal in the States of the Union is an indication of the general desire to fix personal responsibility for fires. Such inquests, as are made by the Fire Marshal's office must speedily demonstrate that over 50% of American fires are due to gross negligence and the curbing of the carelessness by statutes fixing responsibility would seem to be the logical next step.

COMPARATIVE STATISTICS OF FIRE LOSS.

	Per Capita.
Massachusetts (29 cities).....	\$2 77
Connecticut (10 cities).....	2 08
New York (25 cities).....	1 95
New Jersey (16 cities).....	2 42
Pennsylvania (25 cities).....	1 54
Virginia (8 cities).....	3 41
Texas (9 cities).....	4 10
Ohio (21 cities).....	2 48
Indiana (12 cities).....	1 49
Illinois (17 cities).....	2 68
Wisconsin (10 cities).....	2 28
Iowa (10 cities).....	2 10
California (10 cities).....	2 78

A STUDY OF FIRE — FOREIGN CITIES.

England:

In ten of the largest cities, with one exception, reporting the per capita loss, Southampton, with a population of 127,157 had the minimum loss which was 9 cents, and Burkenhead with a population of 122,232 had the maximum loss of 99 cents. The exception noted was Bath, with a population of 50,000 which had a per capita loss of \$2.50. The average for the country was 44 cents. The fire loss of London was not reported.

Ireland:

Belfast with a population of 349,180 and Dublin with a population of 308,500 had a per capita loss of 46 cents and 44 cents respectively.

France:

Among 8 of the largest cities Marseilles with a population of 517,498 has a loss of \$3.79; Coubaix with population 120,115 had a loss of \$1.65 and Bordeaux with population of 257,471 had a loss of \$1.12. The remaining cities varied from Calais of 80,000 population and a loss of 10 cents to Lyons of 472,144 and a loss of 78 cents. Paris had a population of 2,763,393 and had a loss of 43 cents. The per capita loss of the country was 92 cents.

Norway:

Christiana, population 244,000, reports a per capita loss of 25 cents.

Germany:

The greatest per capita loss among 13 of the largest cities was 42 cents, which occurred in Kulsrube a city of 193,953 population. Metz with population 72,000 had a per capita loss of one cent and Berlin with population 2,064,153 had a per capita loss of 4 cents.

Per capita loss for the country was 19 cents.

General:

No foreign city reported more than 2.48 fires per 100 of population and the average for the whole was one fire for every 1,011 of population. The most striking feature of these statistics is

the universal lack of frame buildings or fires in buildings of this sort. Berlin had the largest number which was 44 while 1,795 fires occurred in brick or stone buildings.

On the other hand, in the United States, the city where the number of fires in brick buildings occurred were greater than the number occurring in buildings was found to be rare. Generally the number of fires occurring in frame buildings is found to be greatly in excess.

EUROPEAN AND AMERICAN FIRE LOSSES COMPARED.

Excessive American Fire Loss:

The results obtained indicate that the total annual cost of fires in the United States if buildings were as nearly fireproof as in Europe would be \$90,000,000 and, therefore, that the United States is paying annually a preventable tax of more than \$366,000,000 or nearly enough to build a Panama Canal each year. The figures are set forth in Table 7.

TABLE 7: COMPARISON OF LOSS AND OUTLAY IN THE UNITED STATES ON ACCOUNT OF FIRES IN 1907 WITH PROBABLE LOSS AND EXPENSE IF BUILDINGS WERE AS NEARLY FIRE PROOF AS IN EUROPE.

	Actual loss.		Probable annual loss under European conditions.	
	Total.	Per capita.	Total.	Per capita.
Loss by fire.....	\$215,084,709	.....	\$41,000,000	.....
Excess premiums over insurance paid	145,604,362	.....	28,000,000	.....
Annual expense of waterworks, chargeable to fire service.....	.....	.....	6,000,000	.....
Annual expense of fire department..	.....	.....	10,000,000	.....
Annual expense of private fire protection.....	.....	.....	5,000,000	.....
	\$456,486,151	\$5.34	\$90,000,000	1.05
Total loss by fire.....	215,084,709	2.54	41,000,000	.48
Annual expense of fire protection..	\$241,401,442	\$2.82	\$49,000,000	.57

Excessive Per Capita Loss in Cities:

Another comparison, which is perhaps even more interesting as illustrating America's needless waste and Europe's prudence,

is given in Table 8, showing the per capita loss in cities of the United States and Europe arranged in classes according to the population.

TABLE 8.

PER CAPITA FIRE LOSSES IN 1907 IN AMERICAN AND EUROPEAN CITIES, CLASSIFIED ACCORDING TO POPULATION.

[Statistics for the U. S. gathered by the Geological Survey and for Europe by Bureau of Manufactures.]

POPULATION.	U. S.	Europe.
Over 300,000.....	\$2.24	\$0.65
100,000 to 300,000.....	2.14	.37
50,000 to 100,000.....	2.47	1.67
30,000 to 50,000.....	3.28	.72
10,000 to 30,000.....	2.37	.81
Under 10,000.....	3.47	.....

By comparing American and European cities of the same size the per capita losses shown in Table 9 are found.

TABLE 9.

FIRE LOSSES IN AMERICA AND EUROPEAN CITIES OF THE SAME SIZE.

[Statistics gathered by Geological Survey and Bureau of Manufactures. Each of the foreign cities is compared with the American city marked by the same numeral.]

EUROPEAN LOSSES FOR 1904.

CITY.	Population.	Fire loss.	Loss per capita.
1. Paris, France.....	2,714,068	\$1,266,282	\$0.47
2. Frankfort, Germany.....	324,500	99,492	.31
3. St. Petersburg, Russia.....	1,500,000	2,128,541	1.42
4. Birmingham, England.....	550,000	226,506	.41
5. Sheffield, England.....	426,686	75,989	.18
6. Toulon, France.....	101,602	55,391	.55
7. Bremen, Germany.....	203,847	78,372	.38
8. Molenbeek, Belgium.....	63,678	106,150	1.67
9. Lalken, Belgium.....	31,121	22,349	.72
10. Etterbeck, Belgium.....	23,992	19,504	.81

U. S. LOSSES FOR 1907.

1. Chicago, Ill.....	2,049,185	3,937,105	1.43
2. Cincinnati, O.....	345,230	1,971,217	5.70
3. Philadelphia, Pa.....	1,441,735	2,093,522	1.45
4. Baltimore, Md.....	553,669	916,603	1.66
5. Cleveland, O.....	460,000	515,194	1.12
6. Atlanta, Ga.....	104,984	225,237	2.15
7. St. Paul, Minn.....	204,000	522,447	2.56
8. Evansville, Ind.....	63,957	196,702	3.08
9. Oshkosh, Wis.....	31,033	80,500	2.59
10. Easton, Pa.....	25,238	32,073	1.27

Excessive Cost of Fire Protection in the United States:

The average annual cost of maintaining fire departments in European cities and in American cities is shown in Table 10, from which it appears that the cost in European cities is 20 cents

per capita, and in corresponding cities in the United States \$1.53 per capita, or seven and one-half times as great. It is reasonable to assume that when building construction in the United States shall have reached a condition similar to that in Europe our annual cost on this item alone may be reduced more than \$25,000,000 to \$3,000,000 or to less than one-seventh of the present total. In like manner Table 7, giving the annual cost of fire in the United States in comparison with similar cost in Europe, shows that the total per capita cost in this country is nearly five times that in Europe, indicating a possibility of reducing the grand total of these costs from \$456,000,000 to \$90,000,000, or nearly one-fifth of the present total. It will be noted that the per capita costs in this country and in Europe, which make up these total figures, are almost equally divided between the fire losses and the annual expense of fire protection, and that the ratio of these in the United States and in Europe is nearly the same.

TABLE 10.

COMPARISON OF ANNUAL COST OF MAINTENANCE OF FIRE DEPARTMENTS IN EUROPEAN AND IN AMERICAN CITIES.

CITY.	Population.	Cost of maintenance.	Cost per capita.
Kiel and suburbs, Germany.....	171,000	179,002 M. = \$42,602	\$0.25
Cologne and suburbs, Germany.....	458,037	509,609 M. = 121,286	.26
Berlin, Germany.....	1,888,848	2,035,346 M. = 484,412	.26
Breslau, Germany.....	422,738	465,571 M. = 110,805	.26
London, England.....	6,580,616	£254,045 = 1,238,469	.19
St. Petersburg, Russia.....	1,313,300	578,503 R. = 295,036	.22
Paris, France.....	2,714,068	2,925,334 F. = 564,589	.21
Stockholm, Sweden.....	311,043	269,164 K. = 72,135	.23
Budapest, Austria.....	723,322	281,544 K. = 57,123	.06
Milan, Italy.....	491,460	431,253 L. = 83,231	.17
	15,074,432	\$3,069,688	\$0.20
Cities in United States having population of 100,000 or more.....	16,883,435	\$25,764,386	\$1.53

Causes of the Difference:

The main causes for the difference in fire losses in the United States and foreign countries may be summarized as follows:

1. The difference in the point of view and the responsibility of the individual causing fire to the community in the United States and Europe.

2. Differences in construction, especially in the smaller communities.

3. The absence of frame buildings in European countries.

4. Stricter regulations governing hazards and the storing of hazardous materials.

The public should be brought to understand that property destroyed by fire is gone forever and is not replaced by insurance recovered. The responsibility for a fire should be fixed and owners, tenants and employees each held accountable for any carelessness that might cause injury to property or loss of life.

The difference in construction and maintenance of buildings in Europe is superior to that of the United States, especially outside of the congested areas, where in our country little or no attention has been paid by the authorities to the manner and mode of construction.

The absence of frame buildings and combustible roofs in non-fireproof buildings in European buildings makes them superior to ours as more fire resisting. Outside of our large cities there is little or no restriction placed upon their construction and in our large communities not sufficient restriction, the result being that more than two-thirds of our annual fire loss is in frame buildings. No frame building over one story in height is a safe one to be used for factory purposes.

The manufacture and storing of hazardous materials should be confined to specially constructed buildings and every precaution recommended to protect the lives of the operatives.

FIRE PREVENTION LAWS IN EUROPE.

The British Fire Prevention Committee in 1898 recommended among other things, the following to safeguard the lives of factory employees.

The London Building Act of 1894, sec. 63, provides that every building over 60 feet high shall have on the stories where floors are over 60 feet above the street, such means of escape in case of fire — for the persons employed therein as can be reasonably required in the circumstance of each case. No such stories can be occupied until the London County Council certifies that this has been done.

By the Factory Acts of 1891, every new factory in which more than 40 persons are employed must be provided on the stories

above the ground floor with such means of escape in case of fire as can reasonably be required under the circumstances of each case. Every old factory must, after notice, be similarly provided, subject to arbitration in case of difference. The Factory Act of 1895 extends these provisions to certain workshops and laundries.

GENERAL CONDITIONS.

If a factory has combustible floors and roofs, the requirements may be more stringent than if it is fire resisting throughout. But unless the plan is satisfactory the smoke from a very small fire will quickly spread, disabling the work people and causing a panic, whether the building is fire resisting or not. Some causes of this danger are the inflammability of the stock, the way it is allowed to accumulate so that insufficient room may be left even for passageways, the chance that access to staircases may be cut off by fire, the insufficient width of staircases, the bad management of steps and their liability to become filled with smoke.

Generally the staircases should be of concrete, secondary staircases of minor importance being of oak or teak, the treads 10", the risers $7\frac{1}{4}$ " the width 3' 6" to 4' 6". There should be a fire resisting enclosure to each, with self-closing doors opening by pressure in the direction of each, but not so as to obstruct the landings. The staircase should be well ventilated and adjoin an external wall. If that is impractical it should communicate with the street by a very short passage of fire resisting construction. The roof of the staircase should be fire resisting. If iron or fixed sashes are to be used same should be made to open so that persons could be rescued by means of them. They allude to other means of fire-escape which are contemplated. Iron external staircases kept clear of windows, through which fire can pass, may be constructed.

The outside balcony is a much better arrangement and if it could be generally adopted on each story or only for alternate stories, there would be in more cases reasonable facilities for rescue.

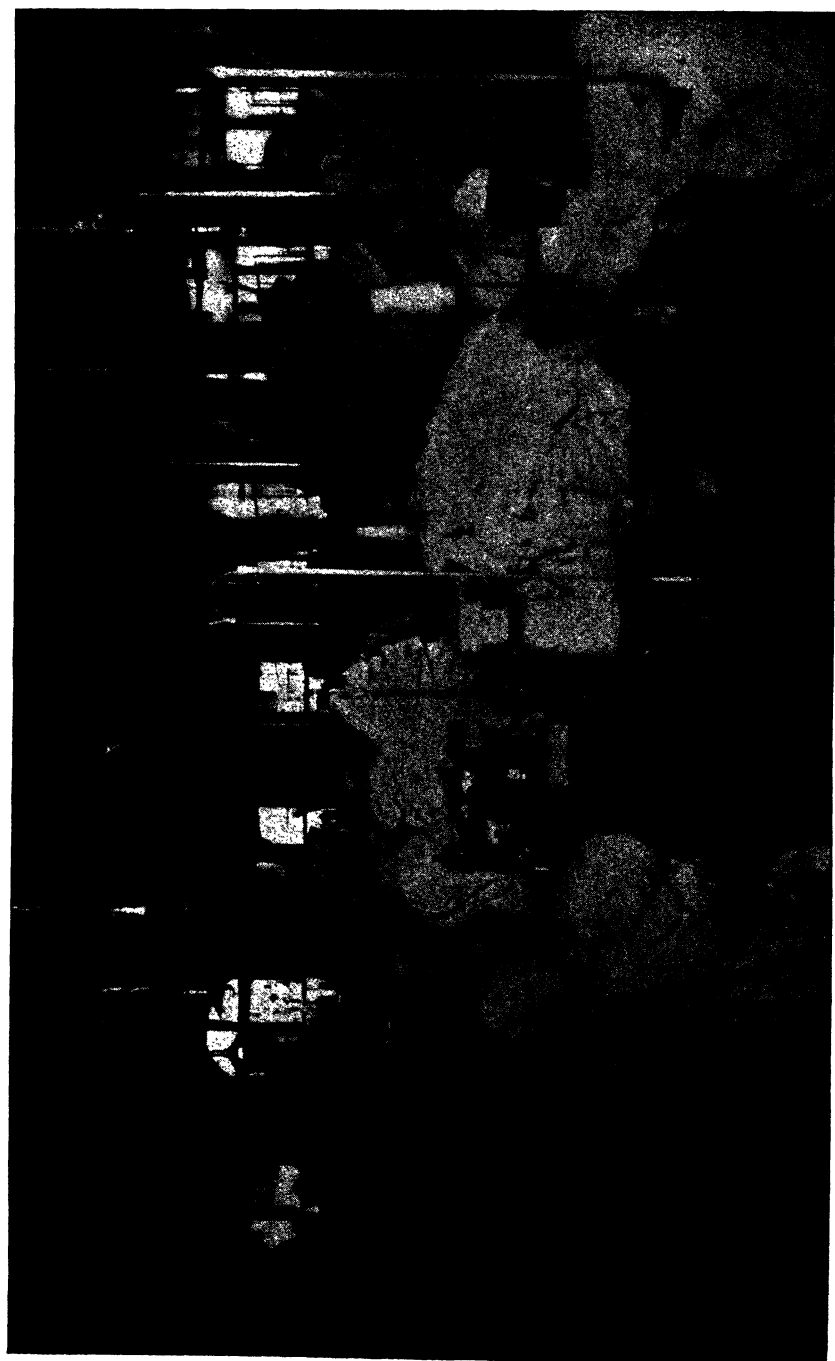
The Asch Building Fire, already referred to, where 145 people were killed, thoroughly aroused the community to the fact that adequate means of egress were not provided in factory buildings and that proper safeguards and auxiliary fire appliances to check a fire and prevent its spread were not installed.

In the practice of my profession I was called in as one of two experts to investigate this fire, for the District Attorney of the city of New York, and found the following defects which are more or less common to all buildings:

There were two stairways in this building instead of three as required by the Building Code. They were enclosed in fireproof partitions but were provided with non-fireproof doors, opening in. The stairways were narrow and only one of them was extended to the roof, the only other means for exit was a fire-escape which lead into a blind court and fire-trap. The fire was communicated from floor to floor through the non-fireproof windows and spread so rapidly that whilst it started on the 8th floor the people that were killed were on the 9th floor. The floors were belittered with rubbish and the fire was supposed to have started by a lighted cigarette butt or a match thrown into the rubbish. The building was equipped with an automatic fire-alarm system, but no sprinklers. There were between 250 and 300 employees on the 9th floor. Adequate means of exit were provided for about 59 employees on each floor.

In addition, the employees were so massed and arranged and the aisles so effectually blocked by machinery, baskets and chairs that it was impossible to reach the exits. There were no fire drills; the majority of the employees knew of but one stairway. One of the doors was undoubtedly locked, and this door was probably never opened. The stand pipe system was inefficient and the lofts filled with inflammable material in process of manufacture, through which the fire swept with such disastrous effect to the inmates. The structure itself was comparatively left intact, save for the wood floors and trim and the non-fireproof partitions and windows which were destroyed.

Practically all the laws of fire prevention, as they are rightly understood, were violated in this building. The owner and tenants were apparently ignorant of the fact. This building was only one of a great many of the same type according to the superintendent of buildings of the Borough of Manhattan. There were no violations filed against it by any of the numerous city and State departments having jurisdiction. The authorities were stirred to action with the result



KNITTING MILLS, FULTON STREET, HUDSON, N. Y.
Finishing room.—Shows overcrowded condition of workroom; the aisles are constantly blocked by huge piles of underwear in boxes, making escape in case of fire very difficult.



that inspections of other buildings in the city and elsewhere revealed the same state of affairs.

After the Iroquois fire in Chicago, a theatre house cleaning was likewise begun in New York and other cities. The difference being that in New York city, at least, there existed a good law which only needed to be rigorously enforced. Considerable opposition was developed. Many changes had to be made to some of the theatres to make them lawful. Many will have to be made to factories to make them safe places to work in. Factories should be at least as safe as theatres.

The general impression prevails that as long as a building is classed as "fireproof" all other safeguards may be ignored. There is introduced in a fireproof factory building unless over 150 feet in height considerable inflammable materials, sheathing, floors, mouldings and trim, partitions, etc. In addition there is the combustible materials in process of manufacture, all of which can at any time cause as great a disaster as the Asch Building fire.

Existing Buildings:

In the city of New York a great many factories are located in converted dwellings and old tenement houses. This class of building is usually built of light inflammable interior construction with vertical openings and unenclosed stairways, etc. These buildings came to be used for factory purposes by a system of evolution as the factory district was extended. At first they are used for light manufacturing without any alteration and although they are unlawfully used for this purpose and do not comply with the Building Laws as to floor strengths, wall thicknesses, etc., the Bureau of Buildings has no jurisdiction until the building is altered, unless the same is structurally unsafe. Later on when the alterations are made the building is found to be already a loft building and the alteration is approved because it is then in the Warehouse Class. In some such way as this has come about the accumulation of the many factory buildings wholly unfit for the purpose for which they are used and are dangerous fire hazards, both to the operatives and to adjoining property.

Another type of dangerous factory building in New York city is the one built before proper Building Laws were in existence

and usually have the same defects as the converted dwelling and tenement.

The height of the above enumerated buildings are usually under six or seven stories in height. They are crowded way beyond any limit as to the safety of the occupants and are inadequately provided with exit facilities.

In the smaller communities of the state, factory buildings have been built with the same defects as enumerated above, with some exceptions of course. This is due to the lack of proper building regulation.

The present Building Laws of New York city allows the erection of buildings under 75 feet in height of non-fireproof construction, including the open non-fireproof stairway. If the area covered by the building is 2,500 square feet or less only one stairway is required besides the outside fire escape.

Buildings over 75 feet in height are required to be made fireproof, but if 12 stories or under and less than 150 feet in height, the trim, floor finish, partitions, etc., can be made of wood. The stairways are to be enclosed in fireproof partitions but the windows unless within 30 feet of another building need not be fireproof.

RECOMMENDATIONS.

Stairway Enclosures:

The interior stairways of existing buildings should be enclosed in fireproof partitions or fire resisting partitions to prevent the spread of flames and smoke from one floor to another and to make them safe means of egress in case of fire. They should have a direct exterior outlet to the street at the ground floor. The stairway itself need not necessarily be incombustible. I would suggest that this requirement be made to apply to buildings more than four stories in height and that the fireproof or fire resisting enclosure be sufficient to resist the severest fire and water test for a period sufficient to allow the occupants to escape. The doorways in the enclosure should be made to open outward without obstructing the passageway, or be sliding.

Required Exits:

Every building more than two stories in height should be provided with at least two means of exit or escape from fire, remote

from each other, one of which on every floor above the ground floor shall lead to or open on an interior stairway which in buildings more than four stories in height shall be enclosed as heretofore provided, or to an exterior enclosed fireproof stairway. The other shall lead to such a stairway; or to a horizontal exit; or to an exterior screened stairway; or, when in the opinion of the industrial board, the safety of the occupants of the building would not be endangered thereby, to fire escapes on the outside of the building. No point on any floor of such factory shall be more than one hundred feet distant from the entrance to one such means of exit. Whenever egress may be had from the roof to an adjoining or nearby structure, even stairway serving as a required means of exit shall be extended to the roof. All such stairways shall extend to the first story and lead to the street, or to an unobstructed passageway leading to a street or road or to an open area affording safe passage to a street or road.

Considerable opposition has been made to the above requirements for present buildings especially in existing buildings under six stories in height; however, no stairway can be considered as a safe means of exit unless it is properly enclosed. I would suggest that the industrial board be given power to decide what shall be the nature of the enclosure in each case in order that the provisions of the law will not work too great a hardship.

Fire-Escapes:

Fire-escapes. All outside fire-escapes shall be constructed of wrought iron or steel and shall be so designed, constructed and erected as to safely sustain on all platforms, balconies and stairways a live load of not less than ninety pounds per square foot with a factor of safety of four. Wherever practicable, a continuous run or straight run stairway shall be used. On every floor above the first there shall be balconies or landings embracing one or more easily accessible and unobstructed openings at each floor level, connected with each other and with the ground by means of a stairway constructed as hereinafter provided and well fastened and secured. All openings leading to outside fire-escapes shall have an unobstructed width of at least two feet and an unobstructed height of at least six feet and shall extend to the floor level or within six inches thereof, and shall be not

more than seven inches above the floor of the fire-escape balcony. Such openings shall have metal frames and be provided with doors constructed of fireproof material with wired glass where glass is used. All windows opening upon the course of the fire-escape shall be fireproof windows. The balconies shall have an unobstructed width of at least four feet throughout their length and shall have a landing not less than twenty-four inches square at the head of every stairway. There shall be a passageway between the stairway opening and the side of the building at least eighteen inches wide throughout except where the stairways reach and leave the balconies at the ends or where double run stairways are used. The stairway opening of the balconies shall be of a size sufficient to provide clear headway and shall be guarded on the long side by an iron railing not less than three feet in height. Each balcony shall be surrounded by an iron railing not less than three feet in height thoroughly and properly braced. The balconies shall be connected by stairways not less than twenty-two inches wide placed at an incline of not more than forty-five degrees, with steps of not less than eight-inch tread and not over eight-inch rise and provided with a hand-rail not less than three feet in height. The treads of such stairways shall be so constructed as to sustain a live load of four hundred pounds per step with a factor of safety of four. There shall be a similar stairway from the top floor balcony to the roof, except where the fire-escape is erected on the front of the building. A similar stairway shall also be provided from the lowest balcony to a safe landing place beneath, which stairway shall remain down permanently or be arranged to swing up and down automatically by counter-balancing weights. When not erected on the front of the building, safe and unobstructed egress shall be provided from the foot of the fire-escape by means of an open court or courts or a fireproof passageway having an unobstructed width of at least three feet throughout leading to the street, or by means of an open area having communication with the street; such fireproof passageway shall be adequately lighted at all times and the lights shall be so arranged as to ensure their reliable operation when through accident or other cause the regular factory lighting is extinguished.

The foregoing provisions shall not apply where at the time this act takes effect there are outside fire-escapes with balconies on each floor of the building connected with stairways placed at an angle of not more than sixty degrees, provided that such existing outside fire-escapes have or shall be provided with the following:

A stairway leading from the top floor balcony to the roof, except where the fire-escapes are erected on the front of the building; a stairway not less than twenty-two inches wide from the lowest balcony to a safe landing place beneath, which stairway remains down permanently or is arranged to swing up and down by counter-balancing weights; a safe and unobstructed exit to the street from the foot of such fire-escapes as provided in subdivision four hereof; steps connecting the sill of every opening leading to the fire-escapes with the floor wherever such sill is more than three feet above the floor level; and all openings leading to the fire-escapes provided with windows having metal frames and sash and with wired glass where glass is used, or with doors constructed in accordance with the requirements of subdivision four; and all windows opening upon the course of the fire-escape provided with fireproof windows.

Recommendations for Factory Buildings Hereafter Erected:

No factory shall be conducted in any building hereafter erected more than one story in height unless such building shall conform to the following requirements:

Fireproof Buildings:

All buildings more than four stories in height shall be of fireproof construction. The roofs of all buildings shall be covered with incombustible material or shall be of tar and slag or plastic cement supported by or applied to arches of fireproof material, and the cornices shall be constructed of incombustible material. All exterior walls within twenty-five feet of any non-fireproof building shall be not less than eight inches thick and shall extend three feet above the roof.

Required Exits:

Floor area and required exits. The term floor area as used in this section signifies the entire space between fire walls, or be-

tween a fire wall and an exterior wall of a building, or between the exterior walls of the building where there is no intervening fire wall. From every floor area there shall be not less than two means of exit remote from each other, one of which on every floor above the ground floor shall be an interior enclosed fireproof stairway or an exterior enclosed fireproof stairway, and the other shall be such a stairway or a horizontal exit. No point in any floor area shall be more than one hundred feet distant from the entrance to one such means of exit. Whenever any floor area exceeds five thousand square feet there shall be provided at least one additional means of exit as hereinbefore described for each five thousand square feet or part thereof in excess of five thousand square feet. In every building over one hundred feet in height there shall be at least one exterior enclosed fireproof stairway which shall be accessible from any point in the building.

Stairways:

All stairways shall be constructed of incombustible material and shall have an unobstructed width of at least forty-four inches throughout their length, except that hand rails may project not more than three and one-half inches into such width. There shall be not more than twelve feet six inches in height between successive landings. The treads shall be not less than ten inches wide exclusive of nosing, and the rise shall be not more than seven and three-fourths inches. No stairway with "winders" shall be allowed except as a connection from one floor to another. The treads shall be constructed and maintained in such manner as to prevent persons from slipping thereon. Every stairway shall be enclosed on all sides by fireproof partitions extending continuously from the lowest story to which such stairway extends to three feet above the roof and the roof of the enclosure shall be constructed of fireproof material at least four inches thick with a skylight at least three-fourths the area of the shaft. All stairways serving as required means of exit shall extend to the roof and shall lead continuously to the street or to a fireproof passageway independent of other means of exit from the building, opening on a road or street, or to an open area afford-

ing unobstructed passage to a road or street. All stairways that extend to the top story shall be continued to the roof. Provision shall be made for the adequate lighting of all stairways by artificial light.

Doors:

All doors shall open outwardly. The width of the hallways and exit doors leading to the street, at the street-level, shall be not less than the aggregate width of all stairways leading to them. Every door leading to or opening on a stairway shall have an unobstructed width of at least forty-four inches.

Partitions:

All partitions in the interior of buildings of fireproof construction shall be of incombustible material.

Vertical Enclosures:

Openings to be enclosed. All elevator and dumb-waiter shafts, vent and light shafts, pipe and duct shafts, hoistways and all other vertical openings leading from one floor to another shall be enclosed throughout their height on all sides by enclosures of fireproof material. Every such enclosure shall have a roof of fireproof material and if the enclosure extends to the top story it shall be continued to three feet above the roof of the building and shall have at the top a skylight in a metal frame at least three-fourths of the area of the shaft or exterior window with metal frame and sash. The bottom of the enclosure shall be fireproof material unless the opening extends to the cellar bottom. All openings in such enclosures shall be provided with fireproof doors, except that openings in the enclosures of vent and light shafts shall be provided either with fireproof doors or with windows having metal frames and sash and wired glass where glass is used.

Recommendations for all Factory Buildings:

No factory shall be conducted in any building unless such building shall be so constructed, equipped and maintained in all respects as to afford adequate protection against fire to all persons employed therein.

Hand Rails:

Stairways should be provided with proper and substantial hand rails.

Stairways, Enclosures at Bottom:

Where the stairway is enclosed by fireproof partitions the bottom of the enclosure shall be of fireproof material at least four inches thick unless the fireproof partitions extend to the cellar bottom. All stairways that extend to the top story shall be continued to the roof.

Door and Window Obstructions:

No door, window or other opening on any floor of a factory building shall be obstructed by stationary metal bars, grating or wire mesh. Metal bars, grating or wire mesh provided for any such door, window or other opening shall be so constructed as to be readily movable or removable from both sides in such manner as to afford the free and unobstructed use of such door, window or other opening as a means of egress in case of need and they shall be left unlocked during working hours. Every door opening on a stairway or other means of exit shall so open as not to obstruct the passageway. A clearly painted sign marked "exit" in letters not less than eight inches in height shall be placed over all exits leading to stairways, and other means of egress and in addition a red light shall be placed over all such exits for use in time of darkness.

Aisles and Passageways to be Kept Clear:

There shall at all times be maintained continuous, safe, unobstructed passageways on each floor of the building, with an unobstructed width of at least three feet throughout their length leading directly to every means of egress, including outside fire-escapes and passenger elevators. All means of egress shall be maintained in an unobstructed condition. No door leading in to or out of any factory or any floor thereof shall be locked, bolted or fastened during working hours.

Industrial Board:

The industrial board shall have power to adopt rules and regulations and establish requirements and standards for construction,

equipment and maintenance of factory buildings or of particular classes of factory buildings and the means and adequacy of exit therefrom.

Limitation of Number of Occupants:

The number of persons who may occupy any factory building or portion thereof above the ground floor shall be limited to such a number as can safely escape from such building by the means of exit provided in the building.

New Buildings:

In buildings hereafter erected no more than fourteen persons shall be employed or permitted or suffered to work on any one floor for every full twenty-two inches in width of stairway conforming to the requirements for a required means of exit except as to extension to the roof, provided for such floor. No allowance shall be made for any excess in width of less than twenty-two inches.

Existing Buildings:

In buildings heretofore erected no more than fourteen persons shall be employed or permitted or suffered to work on any one floor for every eighteen inches in width of stairway provided for such floor and conforming to the requirements for a required means of exit except as to extension to the roof, and for any excess in width of less than eighteen inches, a proportionate increase in the number of occupants shall be allowed. Where the industrial board shall find that the safety of the occupants of any such building will not be endangered thereby, it may allow an increase in the number of occupants of any floor in such building to a number not greater than at the rate of twenty persons for every eighteen inches in width of such stairway provided for such floor, with a proportionate increase in the number of occupants for any excess in width of less than eighteen inches.

Stories over Ten Feet High:

In any building for every additional sixteen inches over ten feet in height between two floors, one additional person may be employed on the upper of such floors for every eighteen inches in width of stairway leading therefrom to the lower of such floors

in buildings heretofore erected, and one for every twenty-two inches in width of such stairway in buildings hereafter erected, provided that such stairways conform to the requirements for required means of exit except as to extension to the roof.

Winders:

In any building, if any stairway has steps of the type known as "winders," a deduction of ten per centum shall be made in counting the capacity of such stairway.

Stairhalls:

In any building where the stairways and stairhalls are enclosed in fireproof partitions or where, at the time this act takes effect, the stairways and stairhalls are enclosed in partitions of brick, concrete, terra-cotta blocks or reinforced concrete, constructed in a manner heretofore approved by the superintendent of buildings of the city of New York, having jurisdiction, if in such city or elsewhere in the state, in a manner conforming to the rules and regulations to be adopted by the industrial board, all openings in the partitions provided with fireproof doors, so many additional persons may be employed on any floor as can occupy the enclosed stairway or halls on that floor allowing five square feet of unobstructed floor space per person.

Horizontal Exit:

In any building where a horizontal exit is provided on any floor such number of persons may be employed on such floor as can occupy the smaller of the two spaces on such floor on either side of the fireproof partitions or fire walls, or as can occupy the floor of an adjoining or near-by building which is connected with such floor by openings in the wall or walls between the buildings or by exterior balconies or bridges, in addition to the occupants of such connected floor in such adjoining or near-by building, allowing five square feet of unobstructed floor space per person, provided that the partitions or walls or balconies through which the horizontal exit is provided to such other portion of the same building or to such adjoining or near-by building shall have doorways of sufficient width to allow eighteen inches in width of opening for each fifty persons or fraction thereof so permitted to be

employed on such floor in the case of horizontal exits heretofore constructed and twenty-two inches in the case of horizontal exits hereafter constructed.

Fire Division Partitions:

In any building heretofore erected of fireproof construction where any floor is subdivided by partitions of brick, terra cotta or concrete not less than four inches thick extending continuously from the fireproofing of the floor to the underside of the fireproofing of the floor above, with all openings protected by fireproof doors not less than forty-four inches nor more than sixty-six inches in width, and in which all the windows on such floor and on the two floors directly underneath are fireproof windows, such number of persons may be employed on such floor as can occupy the smaller of the two spaces on either side of such partitions, allowing five square feet of unobstructed floor space per person, provided there shall be on each side of said partitions at last one stairway conforming to the requirements for a required means of exit; and provided further that such partitions have doorways of sufficient width to allow eighteen inches in width of openings for each fifty persons or fraction thereof so permitted to occupy such floor, and that such doorways shall be kept unlocked and unobstructed during working hours. The provisions of this subdivision shall apply to any fireproof building heretofore erected which may hereafter be made to conform to the requirements of this section.

Automatic Sprinklers:

In any building the number of persons permitted to be employed on any one floor under the provisions of subdivisions one, two and three of this section may be increased fifty per centum where there is constructed, installed and maintained throughout the building an automatic sprinkler system conforming to the requirements of section eighty-three-b of this chapter and to the rules and regulations of the industrial board.

Allowable Floor Space:

In any building, the number of persons who may be employed on any one floor shall in no event exceed such number as can occupy such floor, allowing thirty-six square feet of floor space

per person if the building is not of fireproof construction, and thirty-two square feet of floor space per person if the building is of fireproof construction.

Floor Occupied by More than one Tenant:

Where one floor is occupied by more than one tenant, the industrial board shall have power to make rules and regulations prescribing how many of the persons allowed to occupy such floor under the provisions of this section, may occupy the space of each tenant.

Posting:

In every factory, two stories or over in height, the commissioner of labor shall cause to be posted notices specifying the number of persons that may occupy each floor thereof in accordance with the provisions of this section. Every such notice shall be posted in a conspicuous place in every stairhall and workroom. If any one floor is occupied by more than one tenant, such notices shall be posted in the space occupied by each tenant, and shall state the number of persons that may occupy such space. Every such notice shall bear the date when posted.

Definitions:

The following terms when used in this article shall have the following meaning:

Fireproof Construction:

A building shall be deemed to be of fireproof construction if it conforms to the following requirements: All walls constructed of brick, stone, concrete or terra cotta; all floors and roofs of brick, terra cotta or reinforced concrete placed between steel or reinforced concrete beams and girders; all the steel entering into the structural parts encased in at least two inches of fireproof material, excepting the wall columns, which must be encased in at least eight inches of masonry on the outside and four inches on the inside; all stairwells, elevator wells, public hallways and corridors enclosed by fireproof partitions; all doors, fireproof; all stairways, landings, hallways and other floor surfaces of incombustible material; no woodwork or other combustible material used in any partition, furring, ceiling or floor; and all window

frames, doors and sash, trim and other interior finish of incombustible material; all windows shall be fireproof windows except that in buildings under seventy feet in height fireproof windows are required only when within thirty feet of another building or opening on a court or space less than thirty feet wide; except that in buildings under one hundred feet in height there may be wooden sleepers and floor finish and wooden trim, and except that in buildings under one hundred and fifty feet in height heretofore constructed there may be wooden sleepers, floor finish and trim and the windows need not be fireproof windows, excepting when such windows are within thirty feet of another building.

Fireproof Material:

Fireproof material is material which is incombustible and is capable of resisting the effect of fire in such manner and to such extent as to insure the safety of the occupants of the building. The industrial board shall determine and in its rules and regulations shall specify what materials are fireproof materials within the meaning hereof.

Incombustible Material:

Incombustible material is material which will not burn or support combustion.

Fire Wall:

A fire wall is a wall constructed of brick, concrete, terracotta blocks or reinforced stone concrete, and having at each floor level one or more openings each protected by fire doors so constructed as to prevent the spread of fire or smoke through the openings. In buildings of non-fireproof construction fire walls shall be at least twelve inches in thickness and shall extend continuously from the cellar floor through the entire building and at least three feet over the roof and be coped; except that walls heretofore erected not less than eight inches in thickness, but otherwise conforming to the requirements of this subdivision shall be considered fire walls within the meaning of this subdivision. No opening in such wall shall exceed sixty-six inches in width or sixty square feet in area, except that where openings not exceeding eight feet in width exist in fire walls heretofore erected, such walls may be considered fire walls within the meaning of this subdivision,

and in the case of fire walls hereafter constructed no two openings in the same wall and at the same floor level shall be nearer than forty feet from the center of one opening to the center of another. Every opening in a fire wall shall be protected by a fire door closing automatically on each side of the wall. At every opening in the fire wall there shall be an incombustible floor finish extending over the floor for the full thickness of the wall so as to completely separate the woodwork of the floors on each side of the fire wall. In fireproof buildings the fire walls shall comply with the foregoing requirements in all respects excepting that they may be of the thickness required by the provisions of this section with respect to fireproof partitions; such fire walls and fireproof partitions shall be continuous, from the cellar floor to the under side of the fireproof roof.

Fireproof Partitions:

Fireproof partitions shall be built of brick, concrete, reinforced concrete or terra cotta blocks. When built of brick or concrete they shall be not less than eight inches in thickness for the uppermost forty feet, and shall increase four inches in thickness for each additional lower forty feet or part thereof; or, when wholly supported by suitable steel framing at vertical intervals of not over forty feet, they may be eight inches in thickness throughout their entire height. When wholly supported at vertical intervals of not over twenty-five feet, and built of terra cotta blocks, they shall be not less than six inches in thickness and when so supported and built of reinforced stone concrete, they shall be not less than four inches in thickness. The supporting steel framework shall be properly encased on all sides by not less than two inches of fireproof material, securely fastened to the steel work. All openings in such partitions shall be provided with fire doors.

Fire Doors:

Fire doors shall be metal-covered doors, or doors of such other material as shall be specified in the rules and regulations of the industrial board. They shall be provided with self-closing devices and have incombustible sills. The industrial board shall determine, and in its rules and regulations shall specify, the material and mode and manner of construction and erection of such doors.

Fireproof Windows:

Fireproof windows shall be windows constructed of metal frames and sash and provided with wired glass and shall be of the automatic, self-closing type.

Fire Towers:

Exterior enclosed fireproof stairways shall be stairways completely enclosed from top to bottom by walls of fireproof material not less than eight inches thick extending from the sidewalk, court or yard level to the roof, and with walls extending above the roof so as to form a bulkhead. The stairway shall in all other respects conform to the requirements of this article in regard to enclosed stairways. There shall be no opening in any wall separating the exterior enclosed fireproof stairway from the building. Access shall be provided to the stairway from every floor of the building by means of an outside balcony or vestibule of steel, iron or masonry. Every such balcony or vestibule shall have an unobstructed width of at least forty-four inches and shall be provided with a fireproof floor and a railing of incombustible material not less than three feet high. Access to such balconies from the building and to the stairway from the balconies, shall be by means of fire doors. The level of the balcony floor shall be not more than seven inches below the level of the door sill of the building. The doors shall be not less than forty-four inches wide and shall swing outward onto the balcony and inward from the balcony to the stairway, and shall be provided with locks or latches with visible fastenings requiring no key to open them in leaving the building. The landings in such stairway shall be of such width that the doors in opening into the stairway shall not reduce the free passageway of the landings to a width less than the width of the stairs. Every such stairway shall be provided with a proper lighting system which shall furnish adequate light and shall be so arranged as to ensure its reliable operation when, through accident or other cause, the regular factory lighting is extinguished. The balconies giving access to such stairways shall be open on at least one side upon an open space not less than one hundred square feet in area.

Horizontal Exit:

A horizontal exit shall be the connection by means of one or more openings not less than forty-four inches wide, protected by fire doors, through a fire wall in any building, or through a wall or walls between two buildings, which doors shall continuously be unlocked and the opening unobstructed whenever any person is employed on either side of the opening. Exterior balconies and bridges not less than forty-four inches in width connecting two buildings and not having a gradient of more than one foot fall in six, may also be counted as horizontal exits when the doors opening out upon said balconies or bridges are fireproof doors and are level with the floors of the building, and when all doors of both buildings opening on such balconies or bridges are continuously kept unlocked and unobstructed whenever any person is employed on either side of the exit, and when such balconies or bridges are built of incombustible material and are capable of sustaining a live load of not less than ninety pounds per square foot with a factor of safety of four; and when such balconies or bridges are enclosed on all sides to a height of not less than six feet and on top and bottom by fireproof material, unless all windows or openings within thirty feet of such balconies in the connected buildings shall be encased in metal frames and sash and shall have wired glass where glass is used. In any case there shall be on each side of the wall or partition containing the horizontal exit and independent of said horizontal exit, at least one stairway conforming to the requirements for a required means of exit.

Exterior Stairways:

Exterior screened stairways used as one of the required means of exit in buildings heretofore erected shall be built of incombustible material. The risers of the stairs shall be not more than seven and three-quarters inches in height and the treads not less than ten inches wide. On each floor there shall be a balcony connecting with the stairs. Access to the balconies shall be by means of fire doors that shall open outwardly, so as not to obstruct the passageway, or slide freely, and shall extend to the floor level. All windows or other openings opening upon the course of such stairs shall be fireproof. The level of the balcony floor shall not be more than seven inches below the level of the door sill. The stairs

shall continue from the roof to the ground level, and there shall be independent means of exit from the bottom of such stairs to the street or to an open court or to a fireproof enclosed passageway leading to the street or to an open area having communication with the street or road. The balconies and stairs shall be enclosed in a screen of incombustible material.

ELEVATORS.

1. *Inclosure of Shafts:*

Every hoistway, hatchway or well-hole used for carrying passengers or employees, or for freight elevators, hoisting or other purpose, shall be protected on all sides at each floor including the basement by substantial vertical inclosures. All openings in such inclosures shall be provided with self-closing gates not less than six feet high or with properly constructed sliding doors. In the case of elevators used for carrying passengers or employees, such inclosures shall be flush with the hatchway and shall extend from floor to ceiling on every open side of the car and on every other side shall be at least six feet high, and such enclosures shall be free from fixed obstructions on every open side of the car. In the case of freight elevators the inclosures shall be flush with the hoistway on every open side of the car. In place of the inclosures herein required for freight elevators, every hatchway used for freight elevator purposes may be provided with trap doors so constructed as to form a substantial floor surface when closed and so arranged as to open and close by the action of the car in its passage both ascending and descending; provided that in addition to such trap doors, the hatchway shall be adequately protected on all sides at all floors, including the basement, by a substantial railing or other vertical inclosure at least three feet in height.

2. *Guarding of Elevators and Hoistways:*

All counter-weights of every elevator shall be adequately protected by proper inclosures at the top and bottom of the run. The car of all elevators used for carrying passengers or employees shall be substantially enclosed on all sides, including the top, and such cars shall at all times be properly lighted, artificial illuminants to be provided and used when necessary. The entire top of every freight elevator car or platform shall be provided

with a substantial grating or covering for the protection of the operator thereof.

3. Elevators and Hoistways in Factory Buildings Hereafter Erected:

The provisions of subdivisions one and two of this section shall apply only to factory buildings heretofore erected. In all factory buildings hereafter erected every elevator and every part thereof and all machinery connected therewith and every hoistway, hatchway and well-hole shall be so constructed, guarded, equipped, maintained and operated as to be safe for all persons using the same.

4. Maintenance of Elevators and Hoistways in all Factory Buildings:

In every factory building heretofore erected or hereafter erected all inclosures, doors and gates of hoistways, hatchways or well-holes, and all elevators therein used for the carrying of passengers or employees or freight and the gates and doors thereof shall at all times be kept in good repair and in a safe condition. All openings leading to elevators shall be kept well lighted at all times during working hours, with artificial illumination when necessary. The cable gearing and other apparatus of elevators used for carrying passengers or employees or freight shall be kept in a safe condition.

5. Powers of Industrial Board:

The industrial board shall have power to make rules and regulations not inconsistent with the provisions of this chapter regulating the construction, guarding, equipment, maintenance and operation of elevators and all parts thereof and all machinery connected therewith and hoistways, hatchways and well-holes in order to carry out the purpose and intention of this section.

Interlocking Safety Devices:

The laws of Pennsylvania prescribe that all passenger elevators must be equipped with interlocking safety devices so that the car will not leave a landing until the gates are closed and the operator cannot open the gates until the elevator comes to rest at the landing. Some of these devices are in successful operation in New York city. I would recommend that the industrial board continue

the investigation with a view toward the framing of rules and regulations along similar lines.

Collection and Removal of Rubbish:

The incipient cause of most of the fires in factory buildings is due to the accumulation of clippings and rubbish on the floors and elsewhere. This material should be collected at least twice each day and deposited in incombustible receptacles and be entirely removed from the factory building, at least once each day. When the material is baled, however, it may be safely stored in fireproof enclosures, from which it need not be removed oftener than once each month.

Smoking:

Smoking should be prohibited entirely in all factory buildings. The inspections that were made under my direction revealed the fact that the employees as a rule obey the regulations, but the employer does not. Frequently he was smoking himself while he was vehemently declaring himself in favor of no smoking. I would recommend that the regulation be made to cover the employer as well as the employee. "No Smoking" signs should be conspicuously placed wherever necessary and be printed in the required number of languages.

Fire Drills:

As to fire drills, I believe they should be made compulsory and be made to include all the employees in the building at the same time, and should be held at least once a month. My experience has been that fire drills are held on each floor separately, even when an entire building is used by the same tenant. If fire drills had been held in the Triangle Waist Company factory, it would have been discovered that the time to reach an exit on account of the lack of aisles and the blocking of the aisles, was entirely too long. In addition, the employees would have become familiar with all the exits instead of only the one they were accustomed to using. Any number of witnesses at the trial of the Triangle Shirt Waist Company stated they never knew of but one exit.

Fire Alarm Signal System:

In order to have a fire drill there must necessarily be a fire alarm signal system. This system should be required in all

buildings over two stories in height. The signals should be clearly audible; means of sounding the alarms should be placed on each floor and as many portions of a floor as it is found necessary. The alarms should indicate on what floor the alarm was first sounded. The fire alarm signal system should not be used for any purpose but a fire drill and in case of fire. I made an inspection of a model factory, where most of the safeguards proposed by the factory commission were already installed. The fire gong, however, was used continuously to locate the various employees of the factory. The result of such procedure would be to nullify the effect of the gong in case of fire. In the smaller communities the factory whistle may be used.

Automatic Sprinkler System:

The Chief of the New York City Fire Department made the statement after the Asch fire, that if a sprinkler system had been installed in the building, the great loss of life would have been averted.

Automatic sprinkler protection is based upon the principle of discovering and controlling a fire at its point of origin. The principle requires for its basic elements the protection of all areas, the quick and positive action of the heads, and an adequate supply of water under sufficient pressure. Sprinkler systems are quite as effective in fireproof as in non-fireproof buildings, especially in preventing the spread of fire and giving the occupants more time to make their safe exit from the building.

The April, 1911, Quarterly Magazine of the National Fire Protection Association gives a summary of the efficiency of the sprinkler systems in the fires in the United States since 1897.

Effect of Sprinklers in Fires:

	Number of fires.		Per cent of number with data given.	
	1911	1897-1911	1911	1897-1911
Practically entirely extinguished fire.	643	7,181	59.48	63.79
Held fire in check.....	403	3,514	37.11	31.22
Totally successful.....	1,046	10,695	96.59	95.01
Unsatisfactory.....	37	562	3.41	4.99
Total.	1,083	11257	.....	.....

In the majority of failures recorded the fault was with the water supply and not the sprinkler system proper.

In every factory building over seven stories or over 90 feet in height, with ordinary wooden floor finish or trim, in which any manufacturing is carried on above the seventh story, and more than 200 people are employed for any purpose above the seventh story, an automatic sprinkler system should be installed throughout the same. The sprinkler system shall have at least one automatic supply capable of furnishing water at a pressure sufficient to give not less than 15 pounds on the highest line of sprinklers. The capacity of the automatic supply shall be ample to furnish water to at last 25% of the sprinklers in any one floor area for at least 20 minutes, at the average rate of 20 gallons per head per minute. In all other respects the system shall be constructed to conform to the rules and regulations of the Industrial Board of the Department of Labor. The Industrial Board should have power, to order an automatic sprinkler system, in any building where the conditions are such as to render the occupancy of such building otherwise unsafe.

Effect on Present Factory Buildings:

The following table shows the result of examinations made to determine how the occupancy bill would effect our present factory buildings:

	No.	Per cent.
Buildings that comply with regulations.....	76	37.0
Buildings that comply (all but 1 story).....	49	24.0
Buildings that comply (all but 2 stories).....	23	11.2
Buildings that do not comply.....	57	27.8
<hr/>		
Total number examined	205	100.0
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The table shows that 72.2 per cent of the buildings comply or so nearly comply that by some re-adjustment they can easily be made to comply.

Of the 57 buildings that do not comply 56.1 per cent could be made to comply by providing automatic sprinklers, or they could all be made to comply by constructing bridges to adjoining buildings, or by providing fireproof openings through party walls to adjoining buildings. This latter requirement would be the least

costly, the approximate estimate of cost for the 57 buildings being \$33,000.

About three per cent of all the buildings examined have fire drills, but not any have simultaneous drills of all the floors.

Six per cent of all the buildings are equipped with automatic fire alarms, and three per cent more buildings are equipped with fire-alarm signal systems.

Ten per cent of the buildings examined are equipped with an automatic sprinkler system.

All the fireproof buildings, excepting two, were found to have incombustible stairways enclosed with fireproof partitions, and all that were enclosed with fireproof partitions were provided with fireproof doors, with the exception of eight.

All the fireproof buildings were provided with stand pipes.

Eleven buildings had fire walls.

Fire pails were likewise provided in about all the buildings, not adequately in all cases, and in many instances they were put to other uses than the prescribed regulations require.

The buildings were spasmodically equipped with chemical extinguishers and fire-fighting equipment.

There was a notable absence, in all buildings, of proper fireproof receptacles for clippings and cuttings and no building was completely equipped on all floors.

About 12 per cent of the buildings had the no-smoking signs displayed.

Fifteen per cent of the buildings had exit signs up.

In about eight per cent of the buildings the aisles were blocked with chairs, machinery, etc.

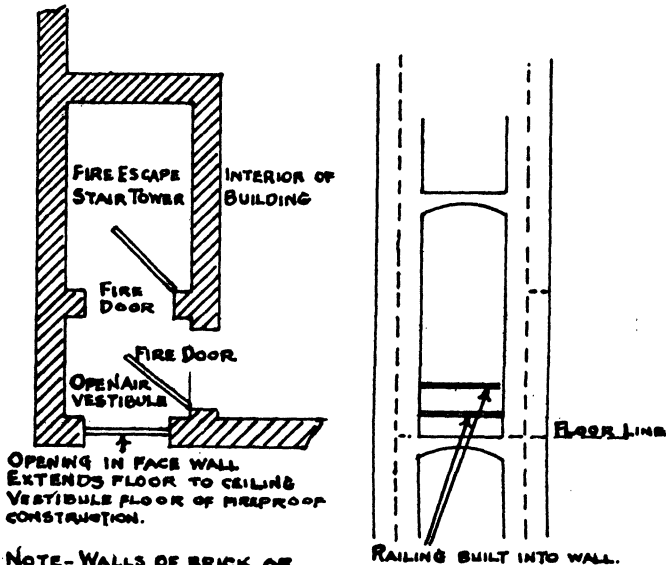
All the buildings twelve stories and under had non-fireproof partitions of various degrees and kinds.

About 12 per cent of the buildings had outside stairways as one of the means of exit. Many of them do not lead directly to the street or through fireproof passageways, but are provided with means of exit to adjoining buildings or to yards of adjoining buildings.

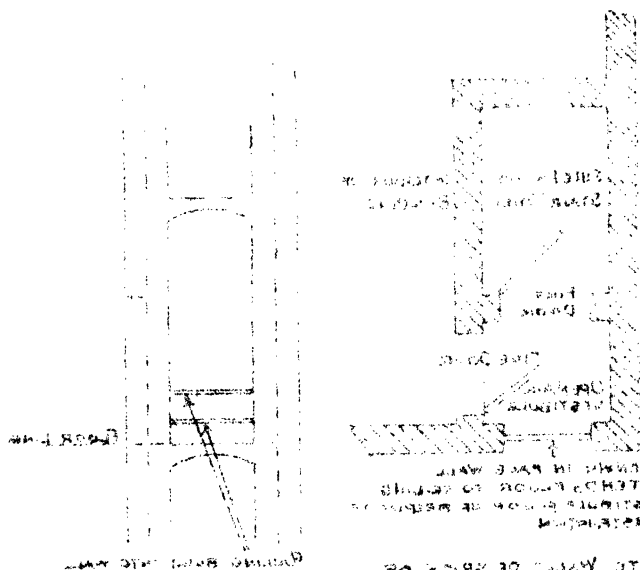
About one-half of all the buildings were provided with standard fire escapes.

No building was found in which all the windows were provided with metal frames and wire glass or fireproof shutters; only the windows within 30 feet of another building were so equipped.

**PLAN OF STAIR TOWER
WITH
OUTSIDE VESTIBULE ENTRANCE
NO DIRECT COMMUNICATION WITH BUILDING**

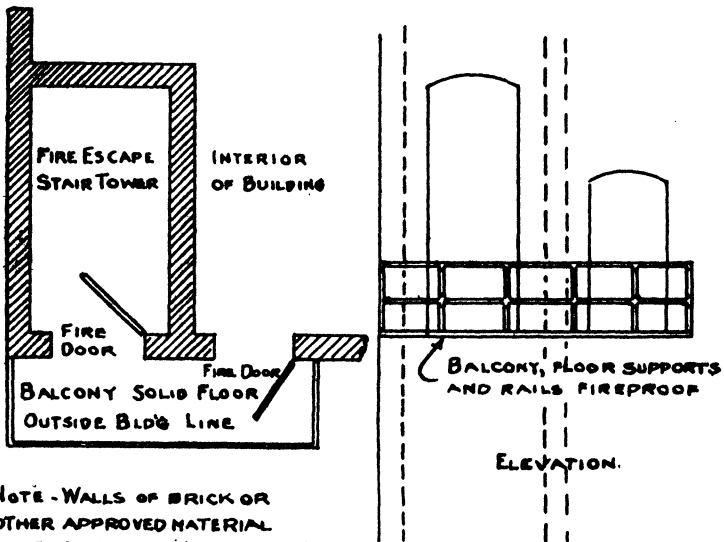


**NOTE- WALLS OF BRICK OR
OTHER APPROVED MATERIAL
BUILT SOLIDLY FROM FOUNDATIONS
TO AT LEAST 36 INCHES ABOVE ROOF
UNLESS BUILDING IS FIREPROOF.
STAIR TREADS ETC. MUST BE
OF FIREPROOF MATERIAL.**

[illegible][illegible]

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

TOWER PLAN
WITH
OUTSIDE BALCONY ENTRANCE
NO DIRECT COMMUNICATION WITH BUILDING



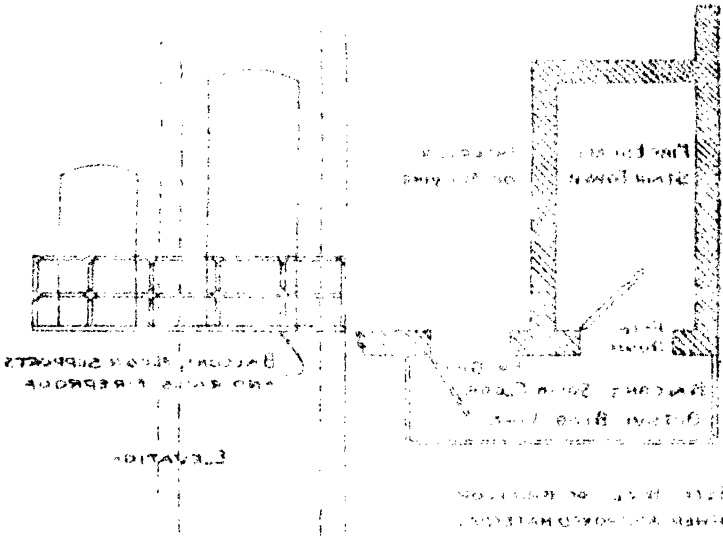
**NOTE - WALLS OF BRICK OR
 OTHER APPROVED MATERIAL
 BUILT SOLIDLY FROM FOUNDATION
 TO AT LEAST 36 INCHES ABOVE ROOF
 UNLESS BUILDING IS FIREPROOF
 STAIR TREADS ETC. MUST
 BE OF FIREPROOF MATERIAL**

TOOTH WALL

PLAN

GENERAL TAILORING TRUNKS

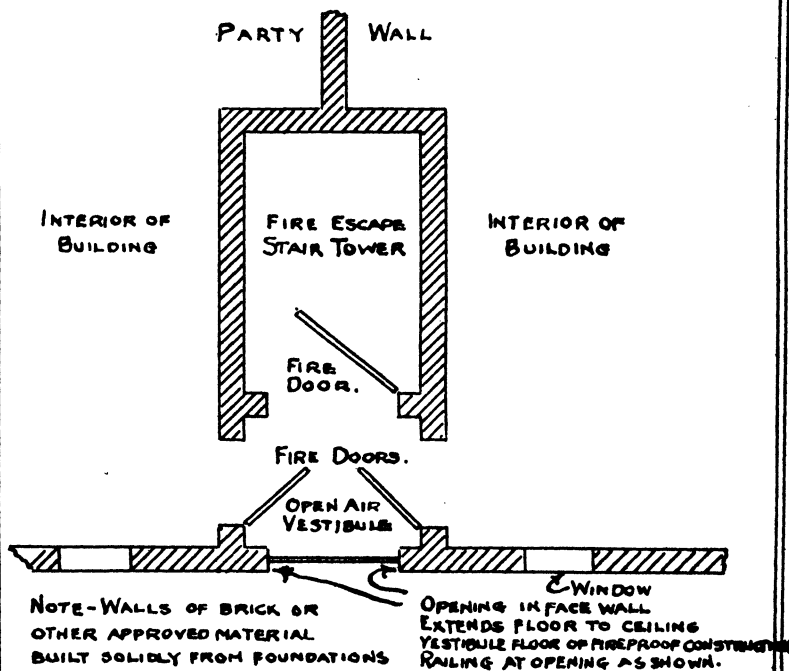
NO. 1000 COMMERCIAL ST. NEW YORK



NOTE: THE WALL IS TO BE
CONSTRUCTED OF CONCRETE
AND IS TO BE FINISHED
WITH A PLASTER OF
PARIS. THE WALL IS TO
BE FINISHED WITH A
PLASTER OF PARIS.

**PLAN OF STAIR TOWER WITH OUTSIDE
ENTRANCE COMMON TO TWO NEIGH-
BORING BUILDINGS**

NO DIRECT COMMUNICATION WITH BUILDINGS.



**NOTE-WALLS OF BRICK OR
OTHER APPROVED MATERIAL
BUILT SOLIDLY FROM FOUNDATIONS
TO AT LEAST 36 INCHES ABOVE ROOF
UNLESS BUILDING IS FIREPROOF.
STAIR TREADS ETC. MUST BE
OF FIREPROOF MATERIAL**

**OPENING IN FACE WALL
EXTENDS FLOOR TO CEILING
VESTIBULE FLOOR OF FIREPROOF CONSTRUCTION
RAILING AT OPENING AS SHOWN.**

THE UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

WASHINGTON, D. C. 20250

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In making the rounds of inspection employees were frequently caught smoking. The greater number of factories do not keep their floors free from clippings and cuttings, neglecting in these two requirements the most important considerations of fire prevention.

In fifty per cent, or one-half the buildings inspected, the stairways will have to be enclosed in fireproof partitions to comply with the recommendations of the commission. This will require an expenditure of about \$200 per floor per stairway; there being very little difference in the cost of any of the materials specified.

This would require an expenditure of from \$600 to \$1,600 per building where there is only one stairway to so enclose and should apply to buildings ranging in height from 3 stories to 7 stories in height. This regulation will apply to perhaps 18,000 buildings in the State.

Fire Tower:

As already described, they consist of stairways enclosed in brick walls or other fireproof materials not less than 8 inches in thickness. Entrance is had by means of a balcony as shown in Cut No. 1 or through vestibules as shown in Cuts No. 2 and No. 3. The stairway should be at least 44 inches wide and built of fire resisting materials. The advantage of the vestibule type over the outside balcony type is that they are not exposed to flames from below or sides and are not exposed to the weather. All windows in the neighborhood should be provided with metal frames and sash and wire glass and be of the self-closing type.

GENERAL PRINCIPLES.

Fire Prevention:

The term fire prevention means the exercise of precautionary measures against fire, first, reducing the fire hazard by eliminating the causes of fire due to carelessness and special hazards; second, controlling a fire by introducing apparatus to extinguish a fire in its incipency; third, providing safe means of egress for the employees in factory buildings in the event of fire; fourth, prescribing certain minimum requirements governing the construc-

tion of new buildings to safeguard lives and property against fire hazard.

Carelessness to be Eliminated:

An examination of the Fire Marshal's reports in various cities, shows that the causes of the great majority of fires can be eliminated by the exercise of precautionary measures against indiscriminate carelessness. Freitag, in his book on Fire Prevention, has analyzed the causes of fires as follows: "In the Boroughs of Manhattan, the Bronx and Richmond, among the principal causes of fires are the following: 887 were due to carelessness with matches, and 228 due to children playing with matches or fire; 401 to carelessness in the use of lighted cigars or cigarettes; 419 to overheated stoves and stove pipes; 282 to bonfires, etc.; 386 to the careless use of candles, tapers, etc.; 216 to curtains coming in contact with gas lights; 161 to the upsetting or explosion of lamps, kerosene, etc. The cause of 2,764 fires were not ascertained, but the Fire Marshal adds that many of these were due to carelessness with matches or lighted cigars or cigarettes. The total number of fires in New York city in the year 1906, in which the above was made, numbered 12,182."

Incendiarism is no doubt the cause of many fires in New York city. Statistics on this point are necessarily hard to get and the percentage due to this cause has been variously estimated.

Education along these lines will help to stamp out most of our careless and consequently easily avoidable fires. In Pennsylvania and Ohio text books on fire prevention and protection are provided and form part of the curriculum in the public schools. Public lectures on the subject would likewise have a salutary effect.

Control of Fires:

All fires are of the same magnitude when they first start. Measures should be devised and installed to put out the fire in its first stages; or structural precautions instituted to confine the fire to certain limited areas. The automatic detection of a fire is the wisest of all precautionary measures, and this, coupled with the automatic sprinkler to control the same, is recommended as a measure of prime importance. A properly constructed stand pipe

system with sufficient hose to reach every portion of a floor and a well organized fire brigade amongst the employees can be of great service. When the above measures are provided almost any fire can be held in check until the arrival of the fire department.

In addition, if a proper fire drill is installed and participated in by all the employees, reinforced with an adequate fire-alarm signal system, the employees can quietly be assembled and marched out of a building to an area of absolute safety.

Construction and Exit Facilities:

The next step is to provide a building properly constructed and equipped to reduce the fire hazard to the contents itself.

Slow Burning Construction:

This kind of construction has been developed in this country, especially in the New England States. The structural members entering into the construction are of large dimensions and the floors are made of plank three or four inches in thickness. Vertical hazards are eliminated. The building is further equipped with all the necessary safeguards to discover, control and prevent the spread of fire. This construction is admirably adapted for factory buildings in the country and smaller communities, but on account of the continued increase in the price of lumber and the decrease in the cost of certain types of fireproof construction it is doubtful whether, at this time, it has any economic advantage over the fireproof building.

In European countries fire resisting materials are employed to a great extent and in a manner not used in this country. For example, stairways, partitions and other partitions are made fire resisting by solid enclosures of thick planks, which are fire resisting for a certain period and retard the spread of fire, during which time the employees can make their escape. The doors and frames are likewise made of heavy materials to serve the same purpose.

Where ordinary wood floor beams are employed, the space between the beams is filled up with fire resisting materials to prevent the spread of the fire from floor to floor. By these simple precautionary measures buildings are made fire resisting with very little additional expense, and this partly accounts for

the fact that fires rarely spread from floor to floor or from one building to another and the consequent insignificant per capita fire loss.

Fire Resisting Buildings:

Our so-called fireproof buildings are in reality only fire resisting of various degrees of efficiency, depending upon the materials employed and the mode and manner of construction.

The materials entering into the construction of a building, in this country, have been first of all subjected to more or less test by the testing laboratories in various parts of the country, and secondly after installation to actual fire tests. The Building Bureau of the city of New York has published a long list of acceptable fireproof materials, which after actual fire tests would seem to need some revision.

I was detailed by the city of New York to make a thorough inspection of the great Baltimore fire, and had opportunity to examine the behavior of all the fireproof materials then used in construction. The devastated area covered some 140 acres or 80 city blocks, comprising about 2,500 buildings and involved a loss of \$40,000,000.

The story of this fire is history, but the lessons that should have been learned then will bear repeating now. The fire started in a dry goods store, and gained considerable headway before it was discovered. Had this building been properly equipped with adequate means to arrest the fire in its first stages there might have been a different story. However, it spread rapidly through the store by means of vertical openings, the great quantities of inflammable material supplying the fuel. It broke through the unguarded openings and spread very rapidly to the unprotected buildings adjoining. It was impossible to control it as there was no barrier anywhere to prevent its spread; fireproof as well as non-fireproof structures being in its power.

In the fireproof buildings nothing was left but the walls and floors, partitions of all kinds being destroyed; of course, the fire was very severe. Plaster blocks suffered most; the others in proportion to the workmanship and construction. The good quality of the material suffered largely on account of the skimmed manner of construction.

The same story is told of the San Francisco fire, excepting that frame constructions contributed additional fire hazards. The Parker Building fire in New York city, with its unprotected vertical hazards, through which the fire spread rapidly; the Equitable Building, where the same conditions prevailed, all furnish us with lessons aplenty. In all these fires materials which stood the tests of our laboratories utterly failed in practical demonstrations, largely the fault of hasty construction.

Stone is a poor fire resisting material; brick, terra cotta and concrete are admirably adapted for walls and partitions in fire resisting buildings, when the workmanship and building material is good.

Construction:

No building is absolutely fireproof, but all buildings should be fire resisting. By judicious planning this result can often be obtained without any additional or excessive cost. Unfortunately the cost must always be reckoned with.

The walls are usually brick, and should be of sufficient strength and stability, and the supporting structural members of steel. The first requirement should, therefore, be that the supporting members are properly fireproofed with a sufficient thickness of fireproof materials. The floors should be sufficiently thick and of such material and workmanship as to insure their staying qualities under the severest test. The vertical openings should be enclosed by fireproof partitions of sufficient thickness and of such stability as to insure their permanency under a severe fire. Fireproof doors should be provided for all openings. The interior partitions should be of the best fire resisting material, but they need not be as thick as the partitions around the vertical openings; these should likewise be provided with fireproof doors at all openings. The use of wood for trim, floors, etc., should be limited or omitted whenever it can be done. To insure against the exposure hazard the exterior windows should all be provided with metal frames and sash and wire glass, of the self-closing type if possible. The occupancy should be limited to the exit facilities provided and in specially hazardous factory buildings additional precautions will have to be taken.

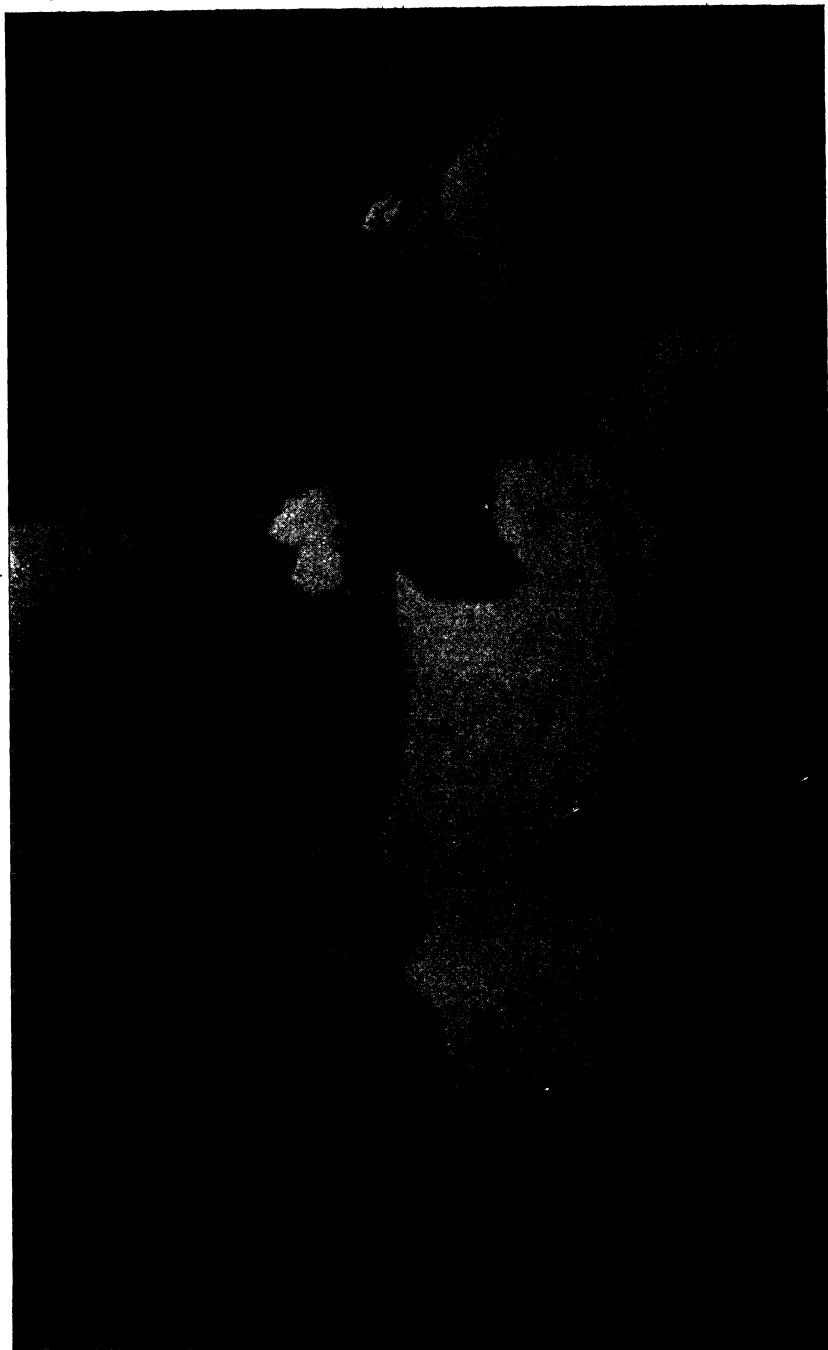
Large horizontal areas should be discouraged and fire walls should be provided with proper subdivisions. The use of the fire tower stairway is to be encouraged. Fire escapes, as usually built, are of little assistance. The roofs of all buildings should be fire resisting.

Auxiliary Fire Apparatus:

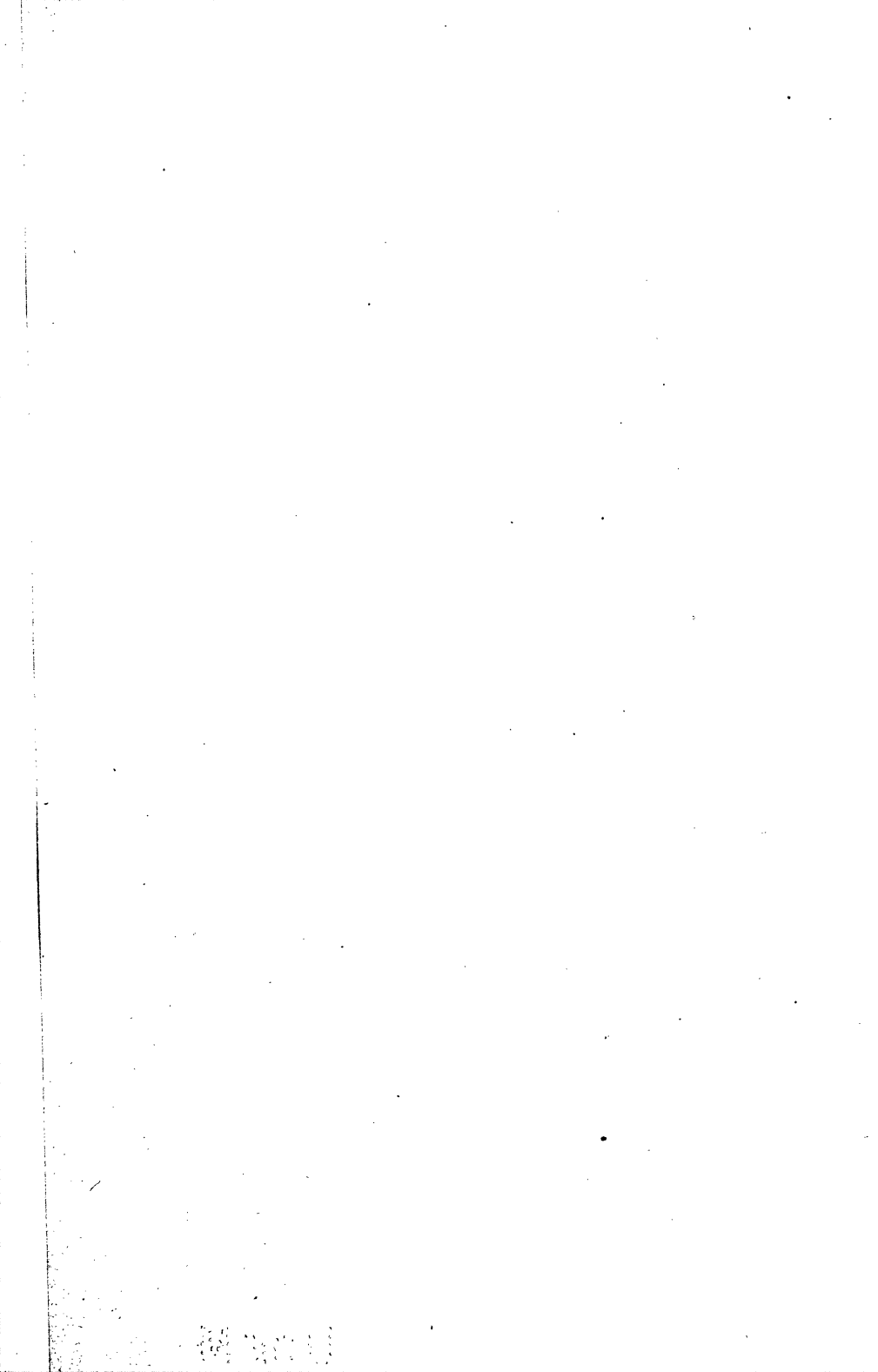
A fire resisting building should be equipped with a stand pipe system, with proper hose and connections on each floor, especially in high buildings where the efficiency of the fire department is limited to certain heights. Fire brigades should be organized to handle the same. Automatic Sprinkler Systems should be installed after careful planning and in a proper and workmanlike manner. Alarm valves should be interposed in the system; the alarm to discover and the sprinkler to put out the fire in its incipency or to hold it in check.

Fire-alarm systems should be installed and regular drills conducted of the employees, not of a perfunctory nature, but well organized so the building can be emptied in the shortest possible time.

Simple protective devices, fire pails, chemical extinguishers do good service in extinguishing fires before they gain any headway.



Bedroom about 8 x 8. Large keg and bed practically fill the dirty, dark room. Baby with head tied, ill with bronchial cough. Annie, 10 years old, sits on bed cutting embroidery. Clementina, 12 years old, also helping mother. Picture taken Saturday, when children work all day.



APPENDIX IV

**REPORT ON
MANUFACTURING IN TENEMENTS IN
NEW YORK STATE**

BY

ELIZABETH C. WATSON.

THE HOMEWORK SYSTEM IN NEW YORK CITY

INTRODUCTION

We have in New York City, and to a limited extent throughout the state, a system in which work is given out by manufacturers to be made or finished in the homes of the workers, where the labor of all members of the family can be utilized without reference to age or factory law.

The influence of such a system must necessarily show its effects upon the worker, the trade and the consumer or general public. The conditions under which home industries are conducted show special evils and special obstacles that stand in the way of regulation.

Investigations of this system have been repeatedly carried on by individuals, social reform committees and labor organizations. Facts have been gathered and presented to the public, but nothing has been done to improve the situation. Laws controlling the conditions of factory workers have been passed from time to time, but the homeworkers and their children, the isolated employees of these same factories, have been sorely neglected and left to the mercy of unrestricted competition and almost incredible exploitation.

In order to obtain the facts regarding this form of industrial labor, the New York State Factory Commission, appointed for the purpose of ascertaining the conditions under which manufacturing is carried on, undertook an official investigation. To arrive at the truth of the situation and obtain a comprehensive view of the system, it was quite evident the subject must be approached from two different aspects:

- (1) The factories employing outworkers.
- (2) The workers and their homes.

With this end in view the first half of the investigation was divided as follows:

- a. To find the kind of trades most easily adapted to homework.

- b. The number of manufacturers in such trades.
- c. Why these trades readily lend themselves to the system of outwork.
- d. How the work done by the outworker differs from the work done by factory hands in the same industry.
- e. If the seasonal variation of the trade is the same for both workers.

The second division was:

- a. To find the conditions in the home in which such work is being done.
- b. Why these workers are doing homework.
- c. The number of hours the workers labor.
- d. The weekly wage.
- e. The number of persons involved in earning this wage.
- f. The time spent per unit of payment.

The following cards were prepared to gather the desired information:

N. Y. STATE FACTORY INVESTIGATING COMMISSION

H. I.....	S. R.....	Ins.....	Date.....
Street.....	No.....	County.....	City.....
TENEMENT, new law.....	old law.....	Brick.....	Frame.....
No. of apartment in tenement.....	No. of families in tenement.....	Licensed.....	unlicensed.....
APARTMENT ON FLOOR.....	Front.....	Rear.....	No. of rooms 1, 2, 3, 4, 5,
ROOMS, where work is done: front.....	kitchen.....	bed room.....	Size of room.....day.....
LIGHTED BY 1, 2, 3, 4, windows. Adequate....., not adequate.....			
ILLUMINATION: By electricity....., gas....., oil lamps....., candles..... Adequate....., not adequate.....			
CLEANLINESS: Walls—good....., poor....., bad..... Ceiling—good....., poor....., bad..... Floor—good....., poor....., bad.....			
PLUMBING: Sink in room....., in hall..... Holes in lead....., in iron pipes.....			
TOILETS: in room....., in hall..... Flush—good....., bad..... Condition—good....., poor....., bad.....			
CONDITIONS OF HALLS: good....., poor....., bad..... Stairways—good....., poor....., bad.....			
CONTAGIOUS DISEASE: Diphtheria....., Scarlet....., Measles....., Tuberculosis....., S. R.....			
Are there any signs of recent fumigation?..... Yes..... No.....			
Date of last inspection by L. D.....			
REMARKS.....			
.....			
.....			
.....			

Name.	Address.	Nationality of Employer.
Trade.		M. F.

1. No. of workers in entire factory.
2. No. of female workers — payroll: Spring, Summer, Fall, Winter.
3. Average weekly wage — Spring, Summer, Fall, Winter.
4. Highest weekly wage — Spring, Summer, Fall, Winter.
5. Lowest weekly wage — Spring, Summer, Fall, Winter.
6. No. of outworkers on payroll — Spring, Summer, Fall, Winter.
7. Average weekly wage — Spring, Summer, Fall, Winter.
8. Highest weekly wage — Spring, Summer, Fall, Winter.
9. Lowest weekly wage — Spring, Summer, Fall, Winter.
10. Work done by female workers in factory — unit of payment for same.
 - a. Machine — unit of payment for same.
 - b. Hand — unit of payment for same.
 - c. Process involved — unit of payment for same.
11. Time spent per unit of payment by female workers in factory.
12. Daily output of female workers in factory.
13. Number of hours worked per day by workers in factory.
14. Work done by outworkers — unit of payments for same.
 - a. Machine — unit of payments for same.
 - b. Hand — unit of payments for same.
 - c. Process involved — unit of payments for same.
15. Average weekly wage for hand.
16. Average weekly wage for machine.
17. Time spent per unit of payment by outworkers.
18. Output per hour by outworkers.
19. Output per day by outworkers.
20. Number in family working — hour, day, night, total.

21. How outworkers are obtained?
22. Does manufacturer keep names and addresses of outworkers?
23. Contractors — name — addresses.
24. Does manufacturer send list of outworkers to Labor Department?
25. Date of last list sent?
26. Does inspector call for such lists when inspecting factory?
27. How often.
28. Manufacturers attitude towards outworkers — for, against.
29. How does he insure against — loss?
30. How does he insure against — injury?
31. Deposit made.

Date.

Investigator's name.

Complete list of names and addresses of all outworkers.

Get payrolls whenever possible.

Information given by

Name.....

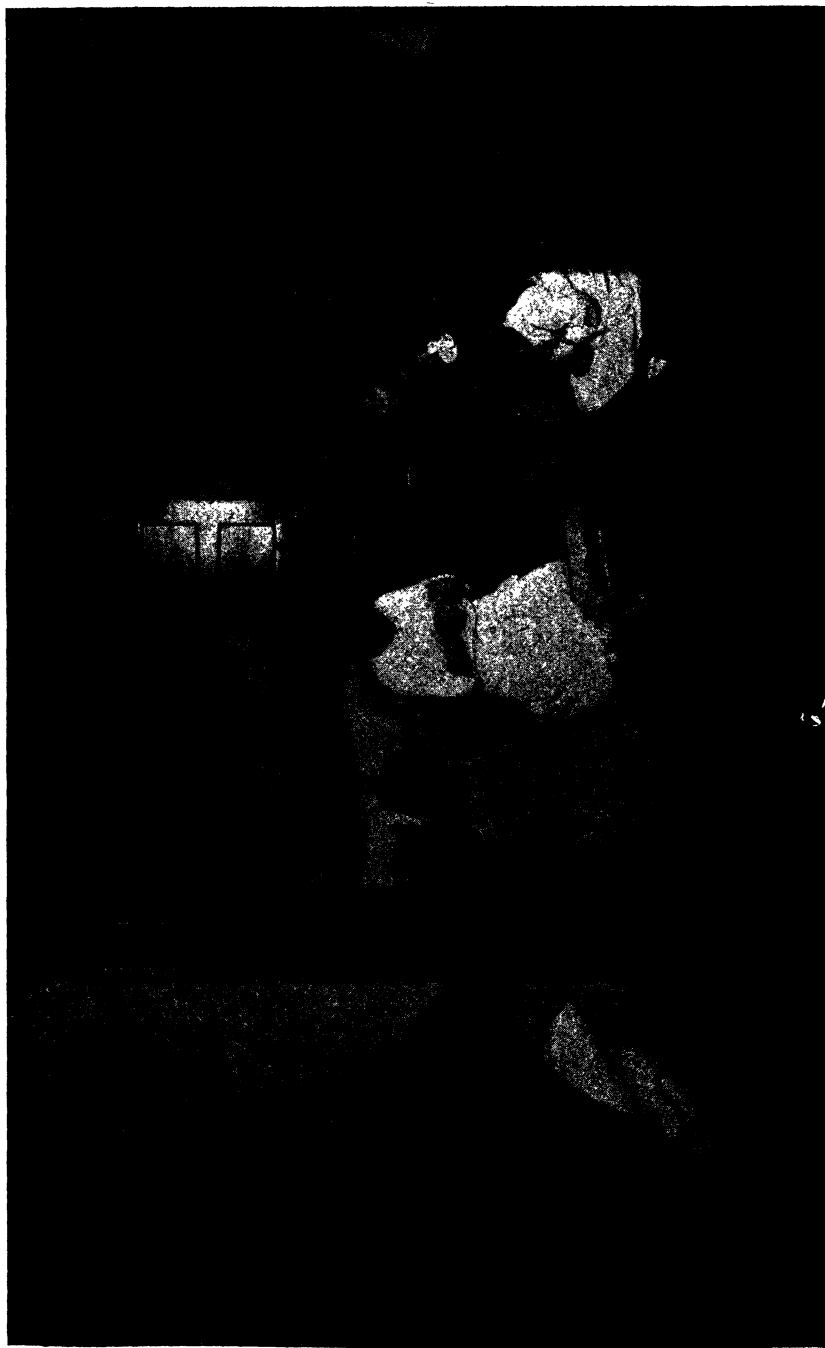
Address.....

Official Capacity.....

That the investigation might be a perfectly fair one, showing phases peculiar to the system and not to any one trade, the work was begun without any special trades in view. That certain trades more readily lend themselves to homework, while in others the very nature of the material handled makes the system impossible, soon became self-evident. Certain manufactures, the products of which in whole or in part can be easily transported and for which no especial factory equipment is necessary, were found to be those given to outworkers.

By following advertisement columns in the daily newspapers and interviewing manufacturers and contractors seeking outworkers, the trades which gave outwork were readily classified.

In the course of the investigation much difficulty was found in ascertaining the number of establishments in the various in-



Armenians. Mother and children. It is her customary position while making passementerie frogs. Has been in this country 10 years. Works about 10 hours per day. Gets 30 cents for 1 gross frogs which it takes her 6 hours to make. Averages 63 cents per day.



dustries; in all cases, therefore, estimates were based upon information given by different manufacturers. As the data from the factories began to accumulate it became apparent that certain kinds of manufacturing were more illustrative of the system and its possibilities than were others; consequently the largest and most important of these particular trades were followed.

In all cases where factories were visited and information sought, either a member of the firm, or, in his absence, the superintendent, was interviewed. In all cases the firm was asked to furnish the names and addresses of the outworkers, to answer the questions in the factory record, and to sign the firm name thereto.

193 factories were visited.

193 schedules were filled out.

147 factories had homeworkers.

75 factories gave names and addresses of homeworkers.

10 intensive studies of payrolls were made.

The names and addresses given by factory employers, as those of their workers were then listed, to be visited in their homes by investigators. No preconceived idea as to locality entered into the decision as to which addresses should be investigated. They were taken at random from Brooklyn, Bronx, Manhattan, Upper East Side, Lower West Side, and the section running from East 4th to East 72nd street between First and Second avenues.

In certain trades, such as muslin underwear, garters, passementerie, crochet and woolen goods (commonly called knitted goods), the time during which the investigations were made was found to be the busy season, and in certain other trades affected by change in fashion, such as flowers and willow feathers, the season was slack, and no estimate of their work could be obtained.

PERIOD OF INVESTIGATION

The investigation began October 10th, 1912, and closed November 25th, 1912, a period of six weeks and three days, during which time eleven investigators were in the field for periods of time running from one week to six weeks. The entire time covered was equal to that of six investigators for four weeks.

Names of Investigators

Mrs. Marie Sabsovich Orenstein	} Assigned to this work by State Labor Department.
Mr. George Cangialosi	
Dr. Anne Moore	Mrs. Bertha Carter
Miss Mary Hopkins	Miss Henrietta Shrewsbury
Mr. Peter Christensen	Miss Amelia Ives
Miss Elizabeth Westwood	Miss Gertrude E. Smith
Mr. F. Michel	

CHAPTER I

THE TRADES IN WHICH THE SYSTEM PREVAILS.

As the time for investigation was limited, and the extent of the system with its innumerable ramifications vast, it was necessary to confine the investigation to a number of typical trades in which the system prevails. The results obtained in the few industries studied indicate the extent of the problem and the immense number of workers it includes. The advertising columns in the newspapers calling daily for homeworkers quickly solved the question as to which trades it was worth while to investigate. From seven to fifteen embroidery firms alone advertised each day for outside workers. An investigation of eighteen of these showed that there must be at the lowest estimate five hundred hand embroidery firms in New York city.

In the eighteen firms especially investigated an average of 103 outworkers per firm was found. On this basis there are 51,500 outworkers in the embroidery trade alone. This estimate is conservative as it has been estimated that if all the hand embroidery firms were properly registered the number would be nearer a thousand. In addition to the outworkers many of these firms have contractors, who in turn employ outworkers; and during at least three months of the year 90% of the inside hands take work home to do at night and on Sundays.

The hand crochet trades rank next in extent to hand embroidery, the factories' list of outworkers in the hand crochet industry running from one hundred to two thousand. If these figures form any basis for calculation, the number of homeworkers must run into the hundred thousands. At the present time it is impossible to estimate with any degree of accuracy the number of people engaged in homework in New York city.

The law permits forty-one articles to be manufactured, prepared, packed, altered, repaired or finished in a tenement house, only if that house is licensed. They are: Coats, vests, kneepants, trousers, overalls, cloaks, hats, caps, suspenders, jerseys, blouses, dresses, waists, waistbands, underwear, neckwear, furs, fur trimming, fur garments, skirts, shirts, aprons, purses, pocketbooks,

slippers, paper boxes, paper bags, feathers, artificial flowers, cigarettes, cigars, umbrellas, or articles of rubber, macaroni, spaghetti, ice cream, ices, candy, confectionery, and nuts or preserves.

In addition to these the following articles are being made or finished in tenements or private houses which are not required to be licensed and are therefore not regulated by inspection; Bonnets, leggings, sweaters, mittens, gloves, afghans, booties, sacks, mufflers, shawls, jackets, lace collars and cuffs, jabots, buttons, handkerchiefs, collar boxes, broom holders, calendars, pin trays, laundry bags, hand bags, pillow tops, center pieces, scarfs, pin cushions, kimonos, pillows, bibs, bath robes, carriage robes, wrappers, stuffed toys, dolls clothing, dolls shoes, play suits, toy novelties, pinwheels, balloons, kites, fly-swatters, hair ornaments, neck ornaments, mesh bags, cigarette tubes, hose supporters, millinery ornaments, all passementerie, napkins, table cloths, doilies, bed spreads, bed covers, bolster covers, roll covers, bed sheets, pillow cases, blankets, hosiery, brushes, tags, laces, human hair and hairdressing articles, sample cards of every description; buttons to be carded and jewelry to be carded.

It will be seen that the majority of these articles in the combined lists fall under certain trade headings:

1. Needle trades including all forms of clothing and hand embroidery.
2. Crochet and hand-stitched goods.
3. Passementerie including fringes, button coverings and ornamental trimmings.
4. Hand-made laces (Irish crochet in all forms).
5. Toys, including dolls' bodies, clothes, outfits, animal forms for stuffing, pin wheels, etc.
6. Novelties including hair ornaments, rubber bathing caps, sponge bags, beaded bags, jewelry setting in both pins and combs, mesh bags, paper boxes, etc.
7. Flowers and feathers.
8. Carding needles, jewelry, buttons, etc.
9. Brushes of all kinds.

10. Cigarette cases.
11. Nuts.
12. Embroidery cutting.
13. White goods — tapeing and finishing.

All of these trades have been considered in this investigation.

TABLE I.

NUMBER OF HOMEWORKERS IN FAMILIES DOING HOMEWORK FOR MANUFACTURERS, BY INDUSTRIES, NEW YORK CITY, 1912.

INDUSTRY.	Families doing each specified kind of homework.	Number of homeworkers in families doing each specified kind of homework.
Crochet buttons.....	20	21
Crochet lace.....	8	15
Crochet slippers, sweaters, etc. ^a	76	102
Passementerie.....	15	21
Hand embroidery.....	21	21
Machine embroidery (cutting out).....	23	47
Beads, etc.....	9	17
Dolls' clothing.....	14	16
Toys.....	6	8
Neckwear, men's and women's.....	4	8
Handkerchiefs and other hemming.....	6	7
White goods.....	16	29
Feathers and flowers.....	35	51
Tobacco.....	29	42
Brushes.....	5	5
Miscellaneous ^b	19	32
Total.....	306	442

^a Includes caps, booties, kimonas, ties, bags, and other articles of wool.

^b Includes pants, children's dresses, shirtwaists, petticoats, boys' Indian suits, infants' wear, tags, postal cards, hair nets, millinery ornaments, garters, gloves, rubber goods.

In 193 factories investigated the total number employed was 7,443. Of these 3,113 or 42% were outworkers, 4,330 were inside hands; 1,282 or 17% of the total number of workers were men, and 3,048 or 41% of the total number of workers were women.*

It is evident from a study of these lists that the nature of homework is governed by three factors; (1) The article must be easily transported by the worker; (2) No factory equipment or intricate machinery is required in its manufacture; (3) Few processes are involved in its manufacture.

* This does not include the tobacco workers.

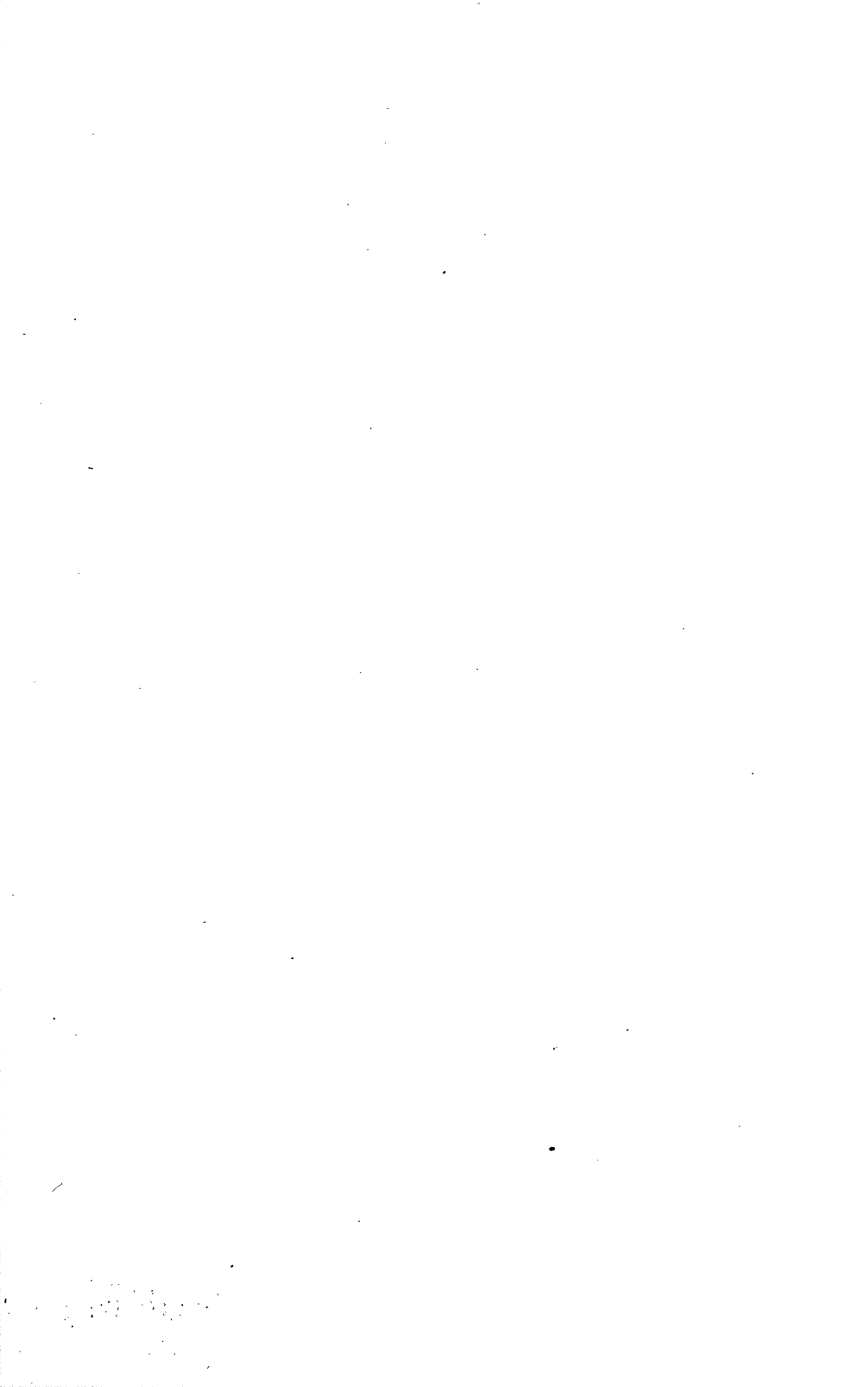
In many factories the work is given out directly to the homeworkers. The women or children call for the work, carry it home, finish it and bring it back themselves. This involves a great loss of time to the worker, varying from a quarter of an hour to two or three hours and even as much as half a day. In a few cases materials are sent by express or messenger. This saves the worker's time, but the carrying charges are paid, usually at least one way, by the worker. In other cases the employer does not deal with the homemaker directly, but uses the services of a contractor. He thus saves the time and expense of office force or checking clerk, but the worker loses in money in the lowered rate of payment received for the work, in order that the contractor may take his toll. The amount taken by the contractor varies, according to the work and the ignorance of the worker, from ten to fifty or even seventy-five per cent of the wages earned.

The contractors frequently have sub-contractors. One of the most pernicious outgrowths of the homework system is the contractor who at times carries on a big commission business with wholesale firms, department stores and exclusive shops, without any expense of plant whatever, and no responsibility concerning registry of business. These contractors obtain workers at the lowest rate of wage and exploit them in every possible way. Frequently they refuse to pay for finished work. Often they move without leaving behind a trace of their whereabouts, taking with them the finished and unpaid-for work, of as many homeworkers as they find possible to exploit.

As a rule homework is hand work, but in a few trades it involves simple machine operations. Where this is true, and the factory has both inside hands and outside hands at the same work, the outside worker who runs her machine by foot power is competing with power machines. Except in the crochet and needle trades, in only a few cases is the work done by outworkers similar to that done in the factory. Ordinarily the work done outside is of a cheaper grade than that done in the factory, or it involves some slight operation which by being done outside the factory saves overhead charges and so reduces the cost of the entire product.



Santareilla, 14 years old; Splendora, 13 years old; Amelia, 11 years old. Cut embroidery four hours after school. All are anaemic and undersized.



The person buying the goods has no guarantee as to the conditions under which they are made. With present inadequate inspection even the licensed houses are not in a sanitary condition, and in unlicensed houses there is not even the semblance of protection. Among the licensed articles are to be found food and clothing; undergarments as well as outside clothing, infant's wear as well as adults' clothing. Toys for children to play with are sent to be made in tenements not only by firms selling cheap goods, but by firms catering to a wealthy and exclusive class. No one can be sure no matter what he pays for this class of goods that they have been made under clean, sanitary factory conditions. Investigators have found doll's clothes laid out on a dirty unmade bed; children's garments in process of making used to cover a scarlet fever patient; nuts cracked with the teeth and picked with the fingers and piled on dirty tables; cigarette papers licked to soften the paste; feathers being knotted in an unsanitary apartment in which there had been four consecutive cases of typhoid fever. Many of these articles are made for high class trade and are bought by people who pay a high price for them and believe that they are getting articles made under good conditions. The price paid by the consumer for such goods bears very little relation to the conditions under which the work is done, or to the price paid the homeworker by the employer.

The chief reason for the existence of the homework system is its economic value to the employer. He gives work out from the factory because he can save factory space and because he can get it done outside more cheaply than inside. In the majority of cases, the operation is simple and is paid for at a low rate, too low a rate to attract workers inside the factory, and as a rule at a lower rate than is paid for the same operation when it is done inside a factory. The consumer does not get the benefit of this difference. A large manufacturer in an important industry states that in calculating the cost of their product, the operation done by the homeworker was calculated at the inside factory price, which was one-half more than that paid the homeworker. The difference represented a clear gain over and above the regular profit. The reason assigned by this employer for his meagre outside pay was that the women were willing to accept his terms, and

that the number asking for homework indicated an unlimited supply of such labor. In many cases the employer himself does not know the real conditions. The system is a convenient one for him and he accepts it without inquiring too closely into what it means. In the majority of cases, the employers state that homeworkers are women who wish to earn a little "pin money" to eke out the family income and who do it in odd moments snatched from their household duties. They further state that it is impossible to earn a living at it, and that the women are content to earn a dollar or two a week. With this comfortable attitude of mind, the employer assumes the role of philanthropist and feels that through work that he furnishes he is giving comfort to many families. The majority of employers approve of homework without looking beyond the advantages accruing to them, a few feel that it should be carefully regulated by law, and a few feel that they would like to give it up altogether if their competitors were forced to do the same. Some of the better class of retail merchants feel indignant that homework is permitted, and that they are not able to assure their customers that their goods are manufactured under sanitary conditions.

The chief advantages that accrue to the employer are:

1. Unrestricted overtime by women and children workers.
2. Unrestricted ages of workers.
3. Saving of floor space and overhead charges.
4. Saving on number of foremen.
5. Saving on wages paid.
6. Saving on number of employees in the slack season of seasonal trades.
7. Securing workers in special rush season.
8. Freedom from sanitary and other factory regulations.

With the advantages come certain disadvantages; but they are so slight that they have not as yet militated seriously against the homework system. The disadvantages may be classified as follows:

1. Possible loss of material — though this loss is reduced to a minimum by a weight checking system and fines.

2. Loss in quality of work, due to lack of direct oversight. This, however, is slight as the operation is usually so simple that it needs no oversight.

3. Loss of time in returning rush orders. As homeworkers are notorious for working overtime, this too is slight.

4. The need of an office force to check material given out and work returned. This, however, is a small item and is more than offset when compared with the large number of foremen necessary to oversee so many workers inside the factory.

CHAPTER II

THE HOMEWORKERS

Nationality:

As a rule homework is done by Italians. Of 306 cases studied, the nativity of the heads of 304 families is known. Of these 185 are Italians by birth, and 22 are German born.

TABLE II.
NATIVITY OF HEADS OF FAMILIES DOING HOMEWORK FOR
MANUFACTURERS. ^a

COUNTRY OF BIRTH.	Families in which the head of the family was born as specified.
United States	41
Armenia, Greece, Turkey, Syria and Bulgaria	25
Bermuda	1
Bohemia, Austria and Hungary	8
Germany	22
Ireland	5
Italy	185
Russia, Lithuania and Roumania	17
Total	304

^a Of the 306 families, 2 did not supply information.

The large proportion of Italians engaged in homework is significant of the fact that their home traditions lend themselves with peculiar readiness to the homework system. The Germans accept homework as a trade and adapt themselves to specific phases of it at which they may become expert. They do not do finishing, but do fine custom tailoring, making vests complete or fine hand-made button-holes. They are expert at making fringes and at crocheting, and pride themselves on the quality of their work. The Irish and Americans adopt homework only as a last resort. They do it only when they are poverty stricken and driven to it by necessity. The Italians come usually from rural districts and know little about factory work and organized industry. The men become laborers or fall into seasonal trades where the wages are small and irregular and must be supplemented. As a rule they have strong home associations, they expect their girls to marry young, and they do not like them to go out into factories.

Accustomed in Italy to depend upon the labor of their children in the fields, they expect them in this country to yield a financial return at the earliest possible moment, and are, therefore, ready to have them adopt homework, a system that lends itself to the exploitation of women and children. Word goes forth to Italy, and family, friends and relatives at once embark for this country.

TABLE III.

LENGTH OF RESIDENCE IN THE UNITED STATES OF HEADS OF FAMILIES DOING HOMEWORK FOR MANUFACTURERS. *a*

YEARS OF RESIDENCE.	Families in which head of family had been in the United States the specified number of years.
Under 5 years.....	26
5 years and under 10.....	53
10 years and under 15.....	60
15 years and under 20.....	30
20 years or longer.....	78
Native.....	41
Total.....	288

a Of the 306 families, 18 did not supply information.

TABLE IV.

YEARS AT HOMEWORK, OF FAMILIES DOING HOMEWORK FOR MANUFACTURERS, NEW YORK CITY, 1912. *a*

YEARS.	Families doing homework for the specified number of years.
1 year or less.....	117
Over 1 year, and under 2 years.....	6
2 years and under 3.....	39
3 years and under 4.....	31
4 years and under 5.....	27
5 years and over.....	79
Total.....	299

a Of the 306 families, 7 did not supply information.

The family:

As a rule the principal homemaker is the mother. If possible, she is assisted by children after school or by other members of the family. In 301 families visited there were 252 in which the fathers were living, and 48 families where there were no fathers.

In the 48 families without fathers, there were 36 widows, one deserted wife and 12 single women.

TABLE V.

CONJUGAL CONDITION OF THE PRINCIPAL WOMAN HOMEWORKERS IN FAMILIES DOING HOMEWORK FOR MANUFACTURERS. ^a

CONJUGAL CONDITION.	Families in which the principal woman homeworker was in the group specified.
Single.....	12
Widowed.....	36
Deserted.....	1
Married.....	252
Total.....	301

^a Of the 306 families, 5 did not supply information on this point.

Almost 63 per cent of the fathers of the families doing home-work are between the ages of 20 and 45 years, an age that represents the best years of a man's life and a time when his economic value to the community should be greatest.

TABLE VI.

AGES OF HEADS OF FAMILIES DOING HOMEWORK FOR MANUFACTURERS. ^a

AGES.	Families in which the head of the family was of the age specified.
Under 25 years.....	10
25 years and under 30.....	33
30 years and under 35.....	37
35 years and under 40.....	54
40 years and under 45.....	58
45 years and under 50.....	37
50 years and over.....	63
Total.....	292

^a Of the 306 families, 14 did not supply this information.

Employment of Children Homeworkers:

The number of children homeworkers varies with the season, and is different in the different industries. In general, children will be found working in unskilled trades where the operation is simple, and the rate paid per hour is small. For children can

readily be taught to do that kind of work and the small wages make it necessary for parents to enlist their services for the extra help they can give.

In the course of the preliminary investigation into this subject which was conducted in 1912, 251 children varying in age from 3½ years to 16 years were found at work in 181 families doing homework. The following statistics were gathered:

Employment of Children in Tenement Manufacture:

Nuts.—41 families visited, 9 families have no children of working age, 32 families had 91 children between the ages of 3 and 16; of these 91 children, 76 were found at work, of the following ages:

<i>Number of Children</i>	<i>Ages</i>
2.....	3½
6.....	4
7.....	5
4.....	6
8.....	7
10.....	8
3.....	9
7.....	10
9.....	11
11.....	12
6.....	13
3.....	14

76

Brushes.—Forty-one families visited, containing 72 children. Out of these, 69 children were working, of the following ages:

<i>Number of Children</i>	<i>Ages</i>
2.....	4
1.....	5
7.....	6
3.....	7

<i>Number of Children</i>	<i>Ages</i>
5.....	8
11.....	9
6.....	10
4.....	11
6.....	12
4.....	13
16.....	14
2.....	15
2.....	16

69

Dolls' Clothes (making).— Sixty-six families visited had 35 children from 4 to 14 years of age; 35 children were found working of the following ages:

<i>Number of Children</i>	<i>Ages</i>
2.....	4
2.....	5
4.....	6
3.....	7
3.....	8
2.....	9
7.....	10
4.....	11
4.....	12
3.....	13
1.....	14

35

Flowers.— The extent to which child labor exists in this form of homework is impossible to discover. During the week December 8-15, 15 houses visited showed 51 children from 7 to 14 years of age working on flowers. The following week, December 17-28, a survey of 33 families showed a list of 70 homeworking children from 4 to 15 years of age, distributed by age as follows:



From right to left—Annunziata, 7 years old; Nickie, 5 years old; Marietta, 13 years old. Cutting embroidery. The three older children work five to six hours daily; also all day Saturday and Sunday. They arise at 5 A. M. and work until 9 P. M., excepting school hours. Annunziata was home from school the day investigator was visiting to help on some rush work.



<i>Number of Children</i>	<i>Ages</i>
3.....	4
7.....	5
3.....	6
6.....	7
4.....	8
8.....	9
10.....	10
9.....	11
9.....	12
5.....	13
5.....	14
1.....	15

70

The following tables show the number of children homeworkers in families doing homework for manufacturers that were found in the course of the present investigation:

TABLE VII.
CHILDREN IN FAMILIES DOING HOMEWORK FOR MANUFACTURERS, BY AGE AND SEX.

AGES.	CHILDREN OF EACH SPECIFIED AGE WHO WERE —								
	DOING HOMEWORK.			NOT DOING HOMEWORK.			ALL CHILDREN.		
	Male.	Fe-male.	Total.	Male.	Fe-male.	Total.	Male.	Fe-male.	Total.
Under 8 years.....	1	7	8	151	168	319	152	175	327
8 years and under 14.....	12	33	45	105	93	198	117	128	245
14 years and under 16.....	3	23	26	23	23	46	26	46	72
Total.....	16	63	79	279	284	563	295	347	642

TABLE VIII.

CHILDREN HOMEWORKERS IN FAMILIES DOING HOMEWORK FOR MANUFACTURERS, BY INDUSTRIES.

INDUSTRY.	CHILDREN DOING EACH SPECIFIED KIND OF HOMEWORK WHO WERE —			
	Under 8 years.	8 years and under 14.	14 years and under 16.	All children.
Crocheted buttons.....			6	6
Crocheted lace.....		5	2	7
Crocheted slippers, etc.....		12	4	16
Passementerie.....			1	1
Hand embroidery.....		1	1	2
Machine made embroidery (cutting out).....	2	13	6	21
Beads, etc.....		1		1
Toys and dolls' clothing.....			1	1
Neckwear.....				
Handkerchiefs, etc.....		1		1
White goods.....	4	7	1	12
Feathers and flowers.....	2	4	2	8
Tobacco.....				
Brushes.....				
Miscellaneous.....		1	2	3
Total.....	8	45	26	79

Seventy-nine children were found at work. Eight of these were under 8 years of age, 45 children were between 8 and 14 years and 25 children between 14 and 16 years.

Seventy-nine children homeworkers under 16 years of age is clearly an underestimation for the following reasons:

- (1) The homework investigation was necessarily limited.
- (2) The period during which the investigation took place was not the season for many kinds of work on which children are employed in the home.
- (3) Through an arrangement with Miss Mary Van Kleeck of the Russell Sage Foundation, our investigation did not touch flowers and feathers in the district where such work prevailed to the greatest extent. It is in this industry that perhaps the largest number of children are to be found at work. Children as young as three years are able to separate the petals for the flower workers.

Miss Van Kleeck conducted an extensive investigation of artificial flowers made in tenements. Her investigators found 48.7 per cent of the total number of homeworkers to be children under

sixteen years of age, 37.4 per cent of whom were under 14 years of age. The following table presents an analysis of the results of Miss Van Kleeck's investigation.

AGES OF HOMEWORKERS IN FAMILIES MAKING ARTIFICIAL FLOWERS AT HOME.

AGES.	HOMEWORKERS AND THE AGES SPECIFIED.	
	Number.	Per cent.
Under 8 years of age.....	38	10.2
8 years and under 14.....	101	27.2
14 years and under 16.....	42	11.3
16 years and over.....	190	51.3
Total.....	371	100.0

Speaking of child labor in the artificial flower trade, Miss Van Kleeck, in her forthcoming book on the subject, says:

‘ Of these 371 homeworkers, nearly half, 181, were children under sixteen years of age. About two in five, 139 in all, were under fourteen. Stated in greater detail, 38 had not yet reached their 8th birthday, 101 were between eight and fourteen and 42 between fourteen and sixteen. Nine over fourteen years of age, were at work by day in factories where their hours of labor were limited by law to 8 in a day; yet in the evening, unprotected by law, they made flowers at home. The youngest child worker was eighteen months old. He was just learning to pick leaves apart to make them ready to be pasted on the stem. Less startling, but probably more serious in its effect, was the labor of 145 school children who worked at home in the morning before school hours and again in the afternoon and evening.”

AGES OF WOMEN HOMEWORKERS.

Of 314 families where the homemaker was an adult woman, that is over 16 years old, 178 or over 55% were between the ages of 25 and 45. These are the best years of a woman's life, when, if she is married her family cares are heaviest and she is most efficient and economically valuable. The average homemaker is unskilled and mechanical to a large degree. It is the “cheap”

work of the factories to which all of these women are sacrificing not only the best years of their lives, but their children and their homes which of necessity they neglect.

TABLE IX.

AGES OF WOMEN HOMEWORKERS IN FAMILIES DOING HOMEWORK FOR MANUFACTURERS.^a

AGES.	Women homeworkers of each specified age.
16 and under 25.....	87
25 and under 45.....	178
45 and over.....	49
Total.....	314

^a Of 320 women homeworkers, 6 did not supply information as to their ages.

GENERAL CONDITIONS.

Homework is found in congested districts all over Greater New York, particularly in Italian neighborhoods. In Manhattan, large numbers of homeworkers were found on the East Side (1) around Madison and Monroe streets and through "The Gap" where the principal work is finishing men's clothing; (2) near the East River front where many Italians live; for two blocks in Goerck street every house contains home finishers; (3) and continuing uptown, especially in the regions between 4th and 33rd streets, in the fifties, and between 90th and 119th streets. On the lower West Side large numbers of homeworkers were found in the Italian district of old Greenwich Village, where the work is principally flowers and feathers, white goods and picking nuts. There is comparatively little homework on the West Side above 8th street. In Brooklyn the greatest number of workers were found in the Bridge section and around Degraw street, working on beads and dolls' clothes, but workers were also found in Brownsville, Canarsie, Queens, and as far as Coney Island. In the Bronx the number of homeworkers is increasing rapidly. Machine embroidery factories are moving into that region, and they give out scallop cutting and thread trimming to neighboring families. Many Italians were found crocheting lace.

As a rule families doing homework live in tenements housing from three to forty families. In a few cases they live in single or two-family frame and brick houses. These buildings are usually dilapidated and in a worse condition than regularly inspected tenements which have some sort of janitor service however inadequate. The tenement flat in which homework is usually done has ordinarily three or four rooms, and rents for from \$9 to \$16 a month. The rooms open into each other, with no private hall. They are square and very small. One room may be 12 x 14 feet, and others 10 x 12 feet or less. The flats are usually overcrowded and the facilities for taking care of personal belongings very slight. There is usually no closet room, though sometimes there is a tiny wardrobe built out from the wall. Where homework is done, trade material must be stored. This means that one room badly needed for family use must be largely given up for factory purposes. Practically all the houses have gas and a few have electricity. The majority of families had adequate light to work by, in the daytime; in seven houses where the daylight was good, there was insufficient artificial illumination. The majority have two wash tubs in the kitchen and a tiny sink with one cold water faucet. Practically all are heated by the coal range which is the family cook stove as well. Steam heat and hot water are luxuries found only in the model tenements, or in houses where the rent is high and the families are doing homework because of temporary financial pressure or to make "pin money."

Very few families have a room where homework can be done without being brought into contact with food or clothing. It is usually done either in the kitchen or in a bedroom. If the work is bulky — picking nuts or finishing underwear or clothing — the bundles of material are often put on the floor for children to sit on or pets to walk over. It is not uncommon for a small child with dirty shoes on to stand on a bag of cracked nuts in her effort to reach the table. Bundles of work are frequently put on the beds which are often incredibly dirty. Moist clothes often hang over the workers' heads.

TABLE X.

PERSONS PER ROOM IN FAMILIES DOING HOMEWORK FOR MANUFACTURERS.^a

PERSONS PER ROOM.	Families in which the number of persons per room was as specified.	Number of persons in these families.
Less than 1 person.....	50	128
1 person and under 2.....	135	658
2 persons and under 3.....	50	358
3 persons and under 4.....	7	63
Total.....	242	1,207

^a Of 306 families, 64 did not supply information as to both total persons in the household and the number of rooms.

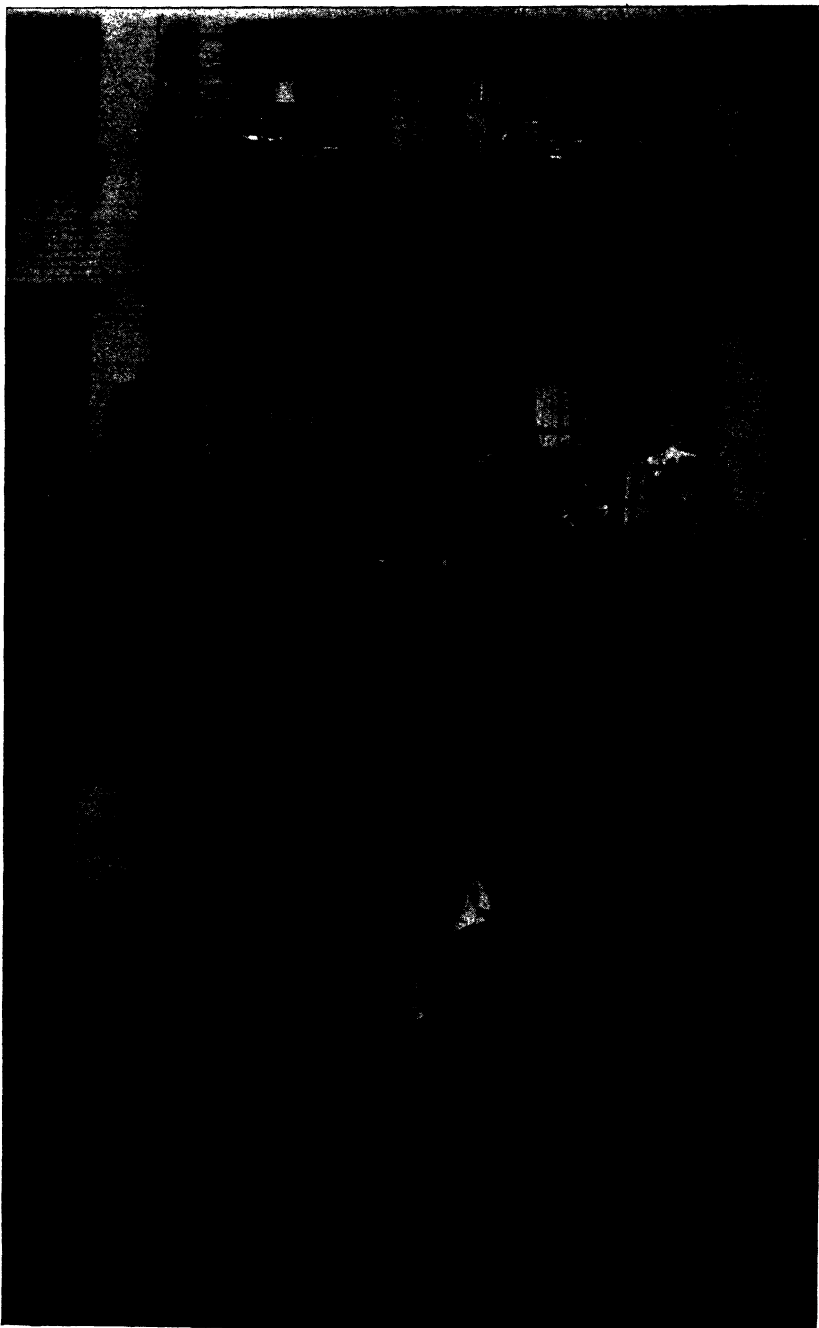
The following descriptions of conditions in specific families were taken from the investigators' cards and illustrate the abuses endangering the consumer which may go on unchecked where homework is permitted.

(1) A woman was found finishing trousers in a filthy kitchen, 14 x 12 feet; three men and two children were sitting in the room, into which water was pouring through a leak in the building.

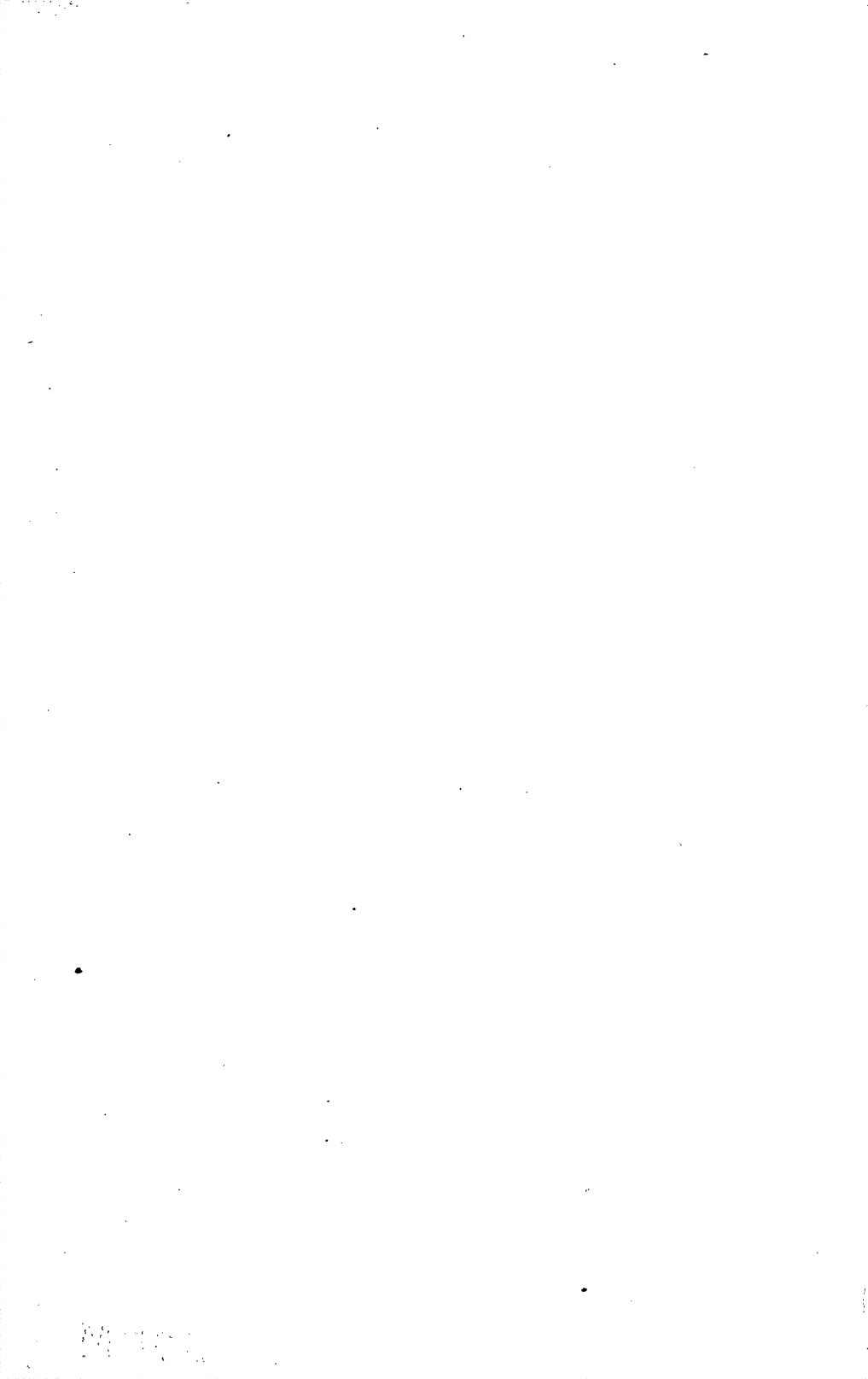
(2) In a two-room flat, lighted by small oil lamps, a woman was picking nuts into an empty dirty cigar-box.

(3) Work on toys was being done by another family in a room which serves as kitchen as well as bedroom; it is very crowded and very dirty; the food is exposed on the table; the family clothing is lying about everywhere. As there is no closet for it, the trade material is exposed.

(4) Several families were found picking nuts in a very large tenement on Laight street. The whole building is in an extremely dilapidated condition. The halls and stairs are absolutely dark and usually wet. The three-room apartments, two rooms having no outside light, were in a filthy condition; the plaster was off the walls and ceiling in patches, and the woodwork and floors did not look as if they had been cleaned or painted in years. In one of them lived a family of six, and the mother picked nuts. In the other the mother of eight children is shelling nuts, and every now and then she cracks one with her teeth. A dirty, half-witted boy of 18 is taking care of the baby and handling nuts.



View of the rear of a tenement-house where home work is done.



(5) Three Greek men were living together; they work in a cigarette factory during the day, and at night prepare the cases. They do their own housework and do not keep the place clean. As they roll the papers they often lick them to moisten the dried glue. These same conditions were found in another flat where four girls lived alone.

(6) A woman doing crocheting acknowledged that her place was in a very dirty condition because she could not spare the time to clean it up. At night this woman works by the light of the street lamp, which is outside her window, in order to save gas.

But more serious than the dangers to the consumer are the effects of the homework on the family itself. Most of the mothers have to do all the housework and take care of the children besides doing the homework, and since every instant taken from the work means loss of money, the homes are left dirty, the food is of the kind most easily prepared, bought at the nearest available place regardless of the quality, and often, strangely enough, even of the price; and the children are neglected or managed with one hand while the mother shells a nut or sticks flowers with the other. In one family where there were children both the mother and father worked all day in factories, and the mother brought coats home to finish at night. She worked in a room which was used as kitchen, dining-room and bedroom and was extremely dirty. Working like this makes the mother irritable and rough with her children. The children must help in order to increase the family income, and they are nearly always given heavy household tasks to perform when they are young. A little girl of eleven years was found doing the entire family washing, besides helping with the rest of the housework. The care of the babies generally falls exclusively on the shoulders of the other children, and little girls often do the cooking and scrubbing, so that their mothers can give every moment to the homework.

Wage Earners Outside the Home in These Families:

In the large majority of cases, homework is done to augment the family income. The small addition is not only welcome but necessary and constitutes the margin which saves the family from

destruction or from application for relief. In a very small number of cases homework is done without any real financial pressure; simply to earn extras.

With the exception of 22 families with no other wage earners except the homeworkers, the families had one or more members working outside the home. Eleven families making *passementerie* had no outside workers except the fathers. The latter earned an average weekly wage of \$12.90, while the average income from the homework was \$3.20 or 19% only of the total income. In other cases where there was more than one wage earner outside the house, the proportion gained from homework is even smaller. When it is also taken into consideration that homework is nearly always seasonal, that there is homework for only about six months in the year, it is apparent that homework practically never furnishes a sum large enough to be considered as a living wage for even one person. It is almost invariably undertaken in order to supplement the inadequate earnings of the father or to tide the family over a period of illness or unemployment, or to meet some other irregular expense.

"Mother doesn't care to have Carrie (8) play outside. Costs too much to play outside; wears too much shoes. Carrie cuts embroidery to make money for her piano lessons. She might play in moving pictures when she gets big."

A woman who makes 9 cents a day crocheting says: "Just enough for coffee, but no milk."

Another woman had begun cutting embroidery to give her children better food. She hates cutting embroidery scallops — "Such heavy bundles to carry."

In industries which are dependent on the weather, like the building and masons and all day laborers, there are very long periods of unemployment. These are the industries which employ the largest number of Italians. It is worth repeating in this connection the fact, stated earlier in the chapter, that in the group investigated there were more Italians than persons of all other nationalities put together. A hod-carrier, the father of one of the families where homework was found, said: "When the weather is not too cold or the sun too hot, or the rain too wet, then there is work." Even though the rate of pay is fairly high

in these trades where employment is irregular, the total income dwindles to a point where the family is barely able to maintain itself. Certain city jobs employing a large number of men pay only \$35-\$40 a month. While this work is steady, it is not enough to support a large family. The candy and artificial flower trades employ a large number of Italian men, and \$8-\$9 a week is not at all an uncommon wage; \$12 is considered high for a ten-hour day in candy factories. In the cases studied the father is the main support, although his earnings are so small that some other source of income is imperative. The mothers and children in these families are giving up their time to earn enough to bring the earnings of the father up to the minimum standard the family can or is willing to accept. Children are kept from school and from the fresh air, and mothers spend the time which should be used in the preparation of food, in keeping the house clean and in making clothing for their children, on homework to gain a sum of money which has significance only when it is compared with the appallingly low wages earned by the fathers of the families.

CHAPTER III

WAGES AND HOURS OF HOMEWORKERS.

The homework problem is not a simple one inasmuch as there is not a direct connection between the price earned per hour and the number of hours worked by the body of workers per week. Under ordinary circumstances and up to certain limits it appears that as the price per hour increases the number of hours per week decreases, but in considering a number of cases it is at once apparent that the matter is complicated by the needs and circumstances of the individual family.

Our investigations show that a majority of homeworkers work approximately five hours a day. A study of individual records shows that this figure holds for all trades and all wage rates. But a large number of women work from nine to eleven hours and many have been found working from thirteen to eighteen hours. In a few cases, women secured not more than three hours sleep at night and this was broken as they rose to work again after a first nap. The homeworker is rarely free from family responsibility. Usually she is a mother who must take care of the children and the home and has to do cooking, cleaning and washing for a large family. Five or six hours for sleep is as much as she can spare.

TABLE XI.

WORK AT NIGHT AMONG FAMILIES DOING HOMEWORK FOR MANUFACTURERS. ^a

WORK AT NIGHT.	Families.
Regular work at night.....	125
Work at night only in rush season.....	19
No work at night	159
Total	303

^a Of the 306 families, 3 did not supply information on this point.

None of the families which worked on crocheted buttons and brushes did work at night. The largest proportion of families doing night work was on tobacco, crocheting of slippers, etc., and cutting out embroidery.

Fathers and husbands of the homeworkers are of the laboring class where the work is unskilled or irregular and where the wages are small and not to be depended upon. The majority of

the fathers of the families investigated earned from \$10 to \$12.50 a week, but many of these trades are seasonal and a large part of the time the father earns only a small proportion of this amount and sometimes nothing at all. In certain trades like candy making and street cleaning, the father though working steadily earns only \$9 or \$10 a week.

TABLE XII.

WEEKLY WAGES OF THE PRINCIPAL BREAD-WINNER IN FAMILIES DOING HOMEWORK FOR MANUFACTURERS, BY REGULARITY OF EMPLOYMENT. ^a

WEEKLY WAGES.	FAMILIES IN WHICH THE PRINCIPAL BREAD-WINNER EARNED THE SPECIFIED WEEKLY WAGES, BY REGULARITY OF EMPLOYMENT AND BY SEX OF PRINCIPAL BREAD-WINNER.								
	Employment steady or for 8 months or more in the year.			Employment unsteady or slack for 4 months or more in the year.			All.		
	Male.	Fe-male.	Total.	Male.	Fe-male.	Total.	Male.	Fe-male.	Total.
Less than \$8.00.....	9	4	13	10	24	34	19	28	47
\$8.00 and under \$10.00....	15	1	16	13	1	14	28	2	30
\$10.00 and under \$12.00....	28	2	30	25	....	25	53	2	55
\$12.00 and under \$15.00....	33	....	33	20	....	20	53	....	53
\$15.00 and over.....	44	....	44	33	1	34	77	1	78
Worker temporarily incapacitated.....	....	....	....	10	....	10	10	....	10
Total.....	129	7	136	111	26	137	240	33	273

^a Of 306 families, 7 women and 26 men, who were the principal bread-winners, did not supply information as to their earnings.

It is manifest, therefore, that in cases where the father's wage is insufficient or he is out of work, if the children are to be fed and clothed and the rent paid, the mother must step into the breach and get the money as best she can. She works from necessity, not for pin money or for pass time, and the number of hours she works depends upon her necessity. If she needs to supplement the family income by a dollar, she will work just long enough to secure this dollar. If she must have more, the hours will grow longer until they extend far into the night.

Weekly Earnings and Pay-Rolls from Factories:

The following tables show the weekly wages of families doing homework based upon the number of workers in each family.

TABLE XIII.

WEEKLY EARNINGS FROM HOMEWORK FOR FAMILIES DOING HOMEWORK FOR MANUFACTURERS.^a

WEEKLY EARNINGS.	FAMILIES REPORTING WEEKLY EARNINGS AS SPECIFIED, BY NUMBER OF HOMEWORKERS.					
	One home- worker.	Two home- workers.	Three home- workers.	Four home- workers.	Five home- workers.	Total.
Under \$2.00.....	68	17	3	1	0	89
\$2.00 and under \$3.00.....	42	5	3	1	0	51
\$3.00 and under \$4.00.....	27	6	6	4	1	44
\$4.00 and under \$5.00.....	19	7	2	1	0	29
\$5.00 and under \$6.00.....	10	5	1	0	0	16
\$6.00 and under \$7.00.....	5	3	0	0	0	8
\$7.00 and under \$8.00.....	3	0	0	0	0	3
\$8.00 and under \$12.00.....	9	2	0	0	1	12
\$12.00 and over.....	1	2	1	2	0	6
Total.....	184	47	16	9	2	258

^a Of 306 families, 19 did not supply information as to weekly earnings. The 29 families working on tobacco have also been omitted from this table as it was impossible to separate the homework earnings from the earnings of the shopworkers.

The price paid for homework differs considerably in different trades, according to whether the operation involves skilled or unskilled labor, or whether it is simple or complex. It further differs for the same operation in different factories. In three firms making crochet slippers situated within a few blocks of each other, the prices paid per dozen for the same kind of slipper made of the same kind of yarn and the same stitch were respectively 40 cents, 50 cents and 75 cents. As homework is entirely unregulated, the price paid depends upon what the worker will work for and upon the conscience of the manufacturer. Complete pay-rolls were obtained from a few manufacturers in the flower, embroidery, Irish crochet and crochet slipper trades.

In the case of one slipper manufacturer, the pay-roll covered the period from February 19th to October 15th. Forty-five names of homeworkers appeared who worked for periods varying from three days to thirty-two weeks. The average amount earned by these workers was \$1.70 per week. They worked from three to thirteen hours a day — or an average of seven hours. Only seven of the forty-five earned more than \$2.50 per week, and it is probable that in these cases more than one person was working.

Another crochet slipper pay-roll covered a period from January 8th to October 21st, a period of twenty weeks. The pay-roll included thirty-four names of homeworkers who worked from one week to twenty weeks, earning on an average \$1.47 a week. Only two of these made more than \$2.50.

From one crochet firm a pay-roll in which twenty-nine names appeared was obtained, running from January 15th to October 14th. These people worked for periods varying from three weeks to forty weeks, and earned on an average \$1.80 per week. Only five earned more than \$2.50. These were either helped by other workers or they received work of a chosen character that could be more easily or more rapidly done.

In the flower trade three pay-rolls were obtained, running respectively from October 31st to November 12th, a period of four weeks; from September 1st to November 30th, a period of thirteen weeks; from September 13th to November 12th, a period of eight weeks; and involving respectively 17, 32 and 41 names. The first of these showed an average of \$8.99 with a minimum of \$4.19 and a maximum of \$20.86. The second showed an average of \$3.45 with a minimum of \$1.02 and a maximum of \$6.73. The third showed an average of \$3.44 with a minimum of 30 cents and a maximum of \$16.10. The next highest figure is \$7.04, indicating that the person earning \$16.10 had some other workers helping her, or was doing a very skilled or high priced operation.

A pay-roll was obtained from a manufacturer of muslin underwear in which eighteen names appeared averaging \$4.83 with a minimum of \$2.69 and a maximum of \$8.58.

Hand embroidery which must be done by a skilled worker is perhaps the best paid trade. On one pay-roll running from September 26th to November 22nd, a period of twelve weeks, 24 names appeared, with an average of \$7.26 a week. Another pay-roll in this trade running from October 28th to November 25th, contains thirteen names and shows an average of \$5.96 a week with a minimum of \$1.32 and a maximum of \$19.52.

Worker's Losses:

Time to Fetch Work. Ordinarily a homeworker must go herself to the factory to receive or return work. Sometimes she

sends a child or neighbor — sometimes when the material is small and light it is mailed and expressed, or if it is too heavy to be transported it is sent by delivery wagon. In the first case the woman ordinarily spends carfare — in the second she pays, as a rule, carrying charges at least one way.

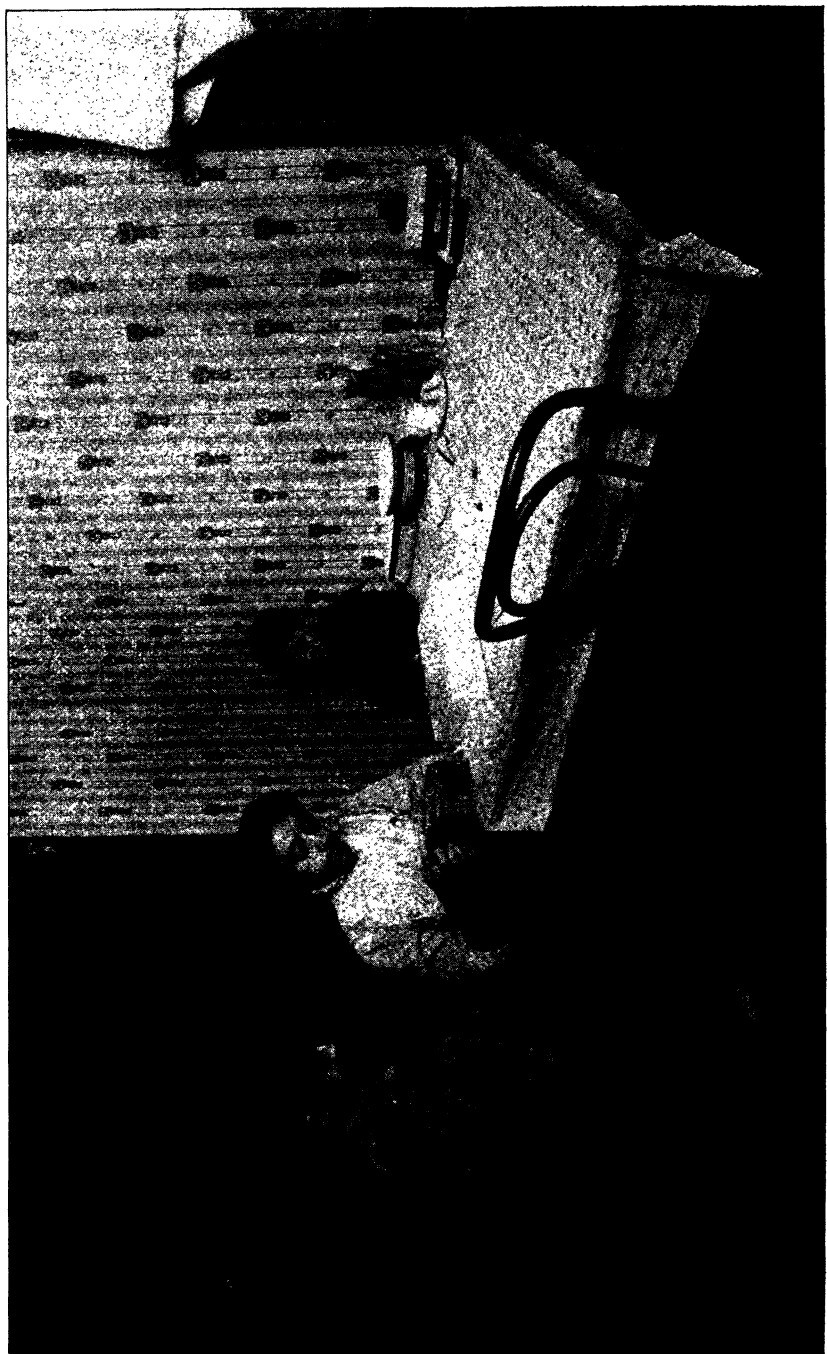
In a few industries, such as crochet which has no inside factory workers, the system is so arranged that a woman has a specified day and hour to call, and is able with comparatively little loss of time beyond that spent in transit from home to factory, to transact her business at the factory for a week or more as the case may be. In other industries where the product is perishable or needed for rush orders, the woman must go every other day — often every day to the factory to take back her finished work. At the factory she must take her turn to be waited on; this necessitates often a wait of one-half to two or three hours, and this time with the time spent in transit is an absolute loss. It varies from fifteen to twenty minutes to half a day.

One woman who lived at a distance from the factory had to go on three successive days. Altogether she earned a dollar, and out of this she spent 30 cents for carfare.

One worker disliked working at home because he lost time going after the work; he lost time arranging it when he got it home; after the long trip his "hand was out" and he could not work as fast; and he lost time having to clear up the litter afterwards. Such extra work, of course, is done by a special man in the factory.

Preparation of Material. The unit of payment is presumably a special operation for which a given price is paid. This price incidentally covers other processes which the worker throws in for good measure. She very rarely counts these processes when she estimates the length of time it takes her to complete the unit of payment and the amount she makes in an hour, yet they take time and add to the length of the working day.

Wool is given out in skeins. It must be wound or nested by the worker. One worker who received 5 cents for crocheting an article claimed that it took her as long to nest the yarn for that particular article as it did to crochet it. The nesting is often



Armenian. Mother sewing passementerie frogs for underclothes. Gets 30 cents per gross, which it takes her 6 hours to make.
Works 6 hours during the day and from 8 p. m. to 12 o'clock, midnight.



done by some other member of the family who is not reckoned as a homeworker. The wage then represents the earnings of two persons, not one.

Flowers must be sorted and bunched. Violets for example are arranged in bunches of a given number with leaves added, although the price paid is only 6 cents a gross for making the flowers. Doll's clothes and gloves must be turned right side out and bundled in dozens before they are returned. Bead workers are paid the same price whether the beads come to them on strings or loose in a box with the string broken.

Charges for Machinery and Supplies. Certain expenses from which the better paid factory worker is free must be met by the homeworker. The obvious cost of rent, light and heat are transferred to the homeworker by the manufacturer. One woman did not work at night because she could not make enough for the gas burned. Another was found crocheting by the light from a street lamp.

Moreover the homeworker must provide her own equipment, from crochet needles, scissors and sewing machine needles, to sewing machines with special attachments when such are required. This means in some cases a continual outlay as in the cutting out of embroidery where the worker must have her scissors sharpened every two hundred yards, a cost of ten cents for every 50 cents of work.

In certain trades materials also must be paid for out of the homeworker's wages. For example, the workers in Irish crochet must buy their own crochet cotton, and flower makers supply themselves with glue. All needle workers pay for their sewing cotton and this one item sometimes amounts to 45 cents a week for the workers on doll's clothes. Women making mercerized cotton bags paid the employer \$1.68 for cotton to make a dozen bags, for which they would receive \$4.00. An Irish crochet yoke for which the worker received 9 cents required an outlay of 2½ cents for the thread.

Charges for Deterioration and Damage. Another kind of loss, incidental to woolen crochet, results from the shrinkage of the wool. There is loss of weight almost every time. In winding,

the fuzz flies off. It is difficult to save short ends, and as the wool grows drier with time the weight decreases. Wool is weighed by the contractor when given out to the homemaker and the slippers are weighed when turned in. Any difference must be paid for by the worker. Thus "Jennie is frequently six ounces short and loses sometimes as much as 15 cents." In another case a homemaker took ten pounds of yarn and ignorant of the effect of heat left it in the sun. When she returned the slippers the wool had lost five ounces in weight and she had to pay five cents an ounce.

In nut picking there are always some broken nuts which must be separated from the whole nuts and returned to the employer. The wages, 4 cents or $4\frac{1}{2}$ cents per pound, covered only the unbroken nuts. For broken nuts the worker received nothing, although the breaking comes less often from careless picking than from the quality of the nut itself or from the machine cracking done at the factory.

Embroidery cutters pay dearly for carelessness, forfeiting for example, ten cents for every yard injured when they receive fifteen cents to twenty-five cents for cutting out a piece of one hundred yards.

After cutting out eight hundred yards of embroidery, for which the pay was \$1.60, the children of one family were delivering the material to the factory when the small wagon in which they carted it upturned on a bad day and the family was charged \$1.00 for what had been damaged.

Employer's Profits:

The impression current among employers that women work at home for long hours and at small wages in order to divert themselves or for pin money, must be corrected. No woman does it unless she must. A few say they do it for occupation, but in many cases a study of their home conditions shows that they are dependent upon this money not for amusements or extras, but to meet the weekly or daily bills for food and clothing. In comparison with the great number of homeworkers the few who may work for occupation are altogether negligible.

What this system that preys upon the health of women and children means to the employer in money can be gathered from these figures obtained from a single firm. For a dozen articles this employer pays a total of \$2.00, as follows:

Material and labor for one part of the finished product...	\$0 80
Material for another part.....	80
Labor to outworkers.....	40
	<hr/>
Total cost	\$2 00
	<hr/>

This product which costs him \$2.00 he sells to the jobber for \$7.50, clearing a profit of \$5.50. This profit is 13.75 times as much as he pays the outworker for labor, and 2.75 times the total cost to himself. The jobber sells this product for which he pays \$7.50 to a retailer for \$9.00, clearing \$1.50 by the operation. The public pays to the retailer from \$12.00 to \$15.00, or 6 to 7½ times the original cost. It is clear from this that the public does not gain from the system of homework. The price paid by the public is as great as though a fair price had been paid to the laborer for the work. For a period of sixteen weeks at two different seasons the output of this firm was 125 dozen a week, at a total cost of \$250. These the firm sells to the retailer for \$937.50, clearing for the one week \$687.50. For the labor the outworkers received \$50.

CHAPTER IV

TOBACCO WORKERS.

CIGARETTE FACTORIES VISITED.	Number acknowledging outworkers.	Number of homeworkers.	Character of work.
31.....	16	100	Making cigarette casings for handmade cigarettes.

The homes of 45 workers were visited at night and 30 cards obtained.

The nationality of workers were as follows: 18 Greeks; 10 Russians; 1 Syrian; 1 Turk.

21 men were found actually working on cases; 7 were not working, their wives making the cases during the day time. 3 other women not of tobacco worker's families were found making cases by night. The 21 men workers averaged 12 hours' work per day; ten hours in the factory on hand made cigarettes and two hours at home making cases. This work consists of rolling the paper into cases.

A package consisting of 50 or 75 papers is placed so that the edges project. On these a paste of flour, sugar and salted water is spread with the finger of the worker. The paper is rolled on a round stick and the edges pressed together. If the paste dries, as it frequently does, the worker invariably licks the edges.

A worker makes an average of 1500 cases a night. These he takes to the factory for the tobacco filling. His wages for the casings made at home are included with his daily wage for filling.

The average wage per week for 28 men for both factory work and home work was \$11.00 — this was for 72 hours' work per week, an average of 15.2 cents per hour.

In one of these families the wife worked from 7 A. M. to 11 P. M. for five days a week and one day (on which she does the washing) from 3 A. M. to 11 P. M. This woman works on Sunday also.

The ultimate cost to the consumer is not lessened on account of the cases being made in the home. These are the most expensive and costly of cigarettes — special brands for clubs, hotels, monogrammed ones for individuals, etc.

A man receives at highest \$1.40 per thousand for cigarettes selling at wholesale at \$18.00 per thousand and to the consumer at \$25.00 per thousand.

CHAPTER V

HOMEWORK IN UP-STATE COMMUNITIES

The homework being done in the up-state cities, towns, villages, and rural sections, with very few exceptions, does not come under the present law licensing such work and therefore goes on with no regulation or inspection whatever. Frequently manufacturers sending out such work are ignorant of conditions under which their work is being done, and do not even know where it is being done, many of them keeping no list of names and addresses. In some cases the workers call at the factory for their work; in others, like Gloversville, work is carried out by wagons and left at the will of the expressman or driver; and again it is mailed out into rural sections.

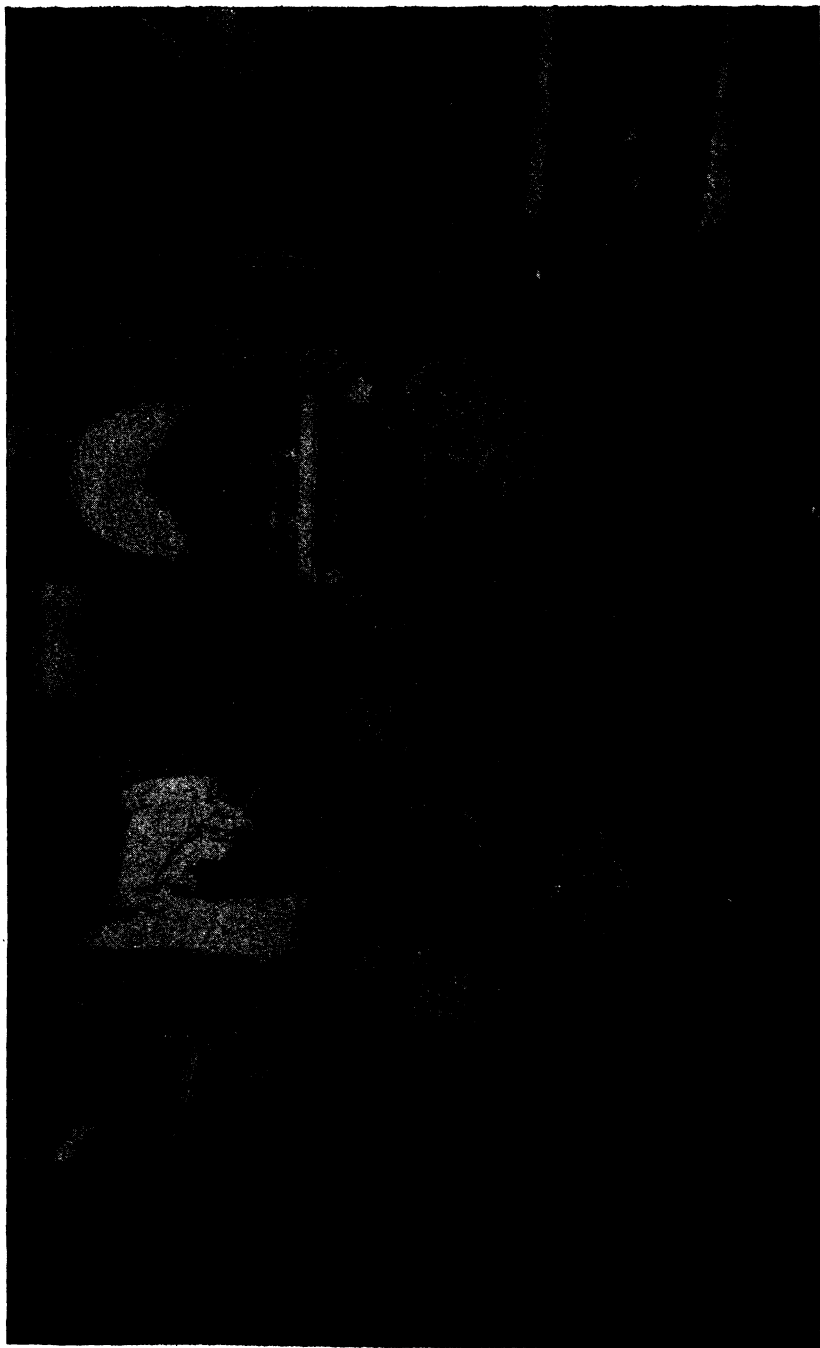
Inspections by agents of the Commission to ascertain the amount and character of manufacturing carried on in homes in up-state cities and towns were conducted during the period between May 20th and August 1st, 1912. In practically all of the cities visited this was found to be the slack season for such work. The data secured therefore represents conditions when little or no work was going on. The small number of homes in which manufacturing was found at the time of inspection is thus accounted for and the facts here presented are merely surface indications of what is believed to be a widespread and growing system.

CITIES VISITED

Auburn	Rochester	Little Falls
Buffalo	Syracuse	Dolgeville
Lockport	Utica	Herkimer
Niagara Falls	Troy	Gloversville
Tonawanda	Yonkers	Cohoes

PLAN OF INVESTIGATION

As in New York City, inspectors visited factories (said to give out work to the homes) and secured where possible lists of names and addresses of their outworkers. This method, while unsatis-



Tenement house, East 114th street, first floor, front, right. 2-room apartment. Working in kitchen making crochet slippers at 40¢ per dozen. Mother, Tessie —; Frances, 13 years old; Rose, 10½ years old; and Mary, 8 years old; at work. 4:30 P. M.

factory in many ways, served to reveal the failure of most manufacturers to keep correct lists or to follow up the distribution of their work in any systematic way. Many lists dated back two and three years, and frequently inspections showed wrong addresses, addresses of houses and streets that did not exist, and workers who had not been working for two years at the trade mentioned.

TRADES FOUND USING HOMEWORKERS — BY CITIES

Auburn	Rope Splicing Button Carding
Buffalo	Finishing Men's Clothing
Lockport	Button Carding
Niagara Falls	Carding Hooks & Eyes
Tonawanda	Paper Boxes Mending Maltster's Bags Sewing Buttons on Shirts Cigars
Rochester	Finishing Men's Clothing Button & Hook & Eye Carding Infant's Shoes (moccasins) Paper Boxes Women's Neckwear Novelties, Sanitary Belts, etc. Druggists' Specialties — Thumb Stalls — Wrist Bands Fringe & Passementerie Seedsman's Paper Bags
Syracuse	Finishing Men's Clothing Fancy Trimmings on Waists Crocheting — Infant's Wear, shawls, etc. Willow Baskets (in Liverpool)
Utica	Finishing Men's Clothing Crocheting Tops of Knit Underwear

Little Falls	Trimming Felt Slippers Gloves
Dolgeville	Trimming Felt Slippers
Herkimer	Running Tapes in Knit Underwear
Gloversville	Making Gloves and Trimming Gloves
Troy	Brushes — Collars and Shirts
Cohoes	Brushes — Collars and Shirts
Yorkers	Willow Plumes

VISITS TO HOMEWORKERS

In each of the cities investigated, after securing lists of homeworkers from manufacturers, inspectors called at their homes to ascertain the number of workers, adults and children, the size of the family, earnings of the various members, rent paid and such other items as would aid in showing the relation of homework to the family's support.

NUMBER OF HOMES VISITED AND CHARACTER OF WORK FOUND.

WORK.	Homes.
Turning collars.....	50
Brush making.....	19
Carding hooks and eyes.....	16
Button carding.....	14
Finishing clothes.....	20
Infants' shoes.....	10
Notions.....	8
Making boxes, rope, neckties, fringes, bows, tassels.....	11
	148

UP-STATE OPERATION OF THE HOMEWORK LICENSE LAW

In June, 1912, according to the records of the Department of Labor there were less than 500 tenement houses in up-state cities licensed for manufacturing. Of these Albany had 45, Buffalo 72, Utica 76, Syracuse 36, Rochester 270. These licenses do not apply to tenements only, but also to rear shops, of which there are 297.

These figures, however, give no real conception of the extent of homework in up-state communities. The licensing system applies only to a tenement house, which is defined in the labor law as "Any house or building, or portion thereof, occupied as the home or residence of three families or more living independently of each other, and doing their cooking upon the premises, and having a common right in the halls, stairways, yards, water closets or privies, or some of them." In most of the smaller cities, tenements of this character are not found. In such places homework is carried on in two family and private houses. This is notably true in Troy where there are thousands of women working in such houses on collars. One firm alone was found to have listed one thousand such outworkers. A similar condition prevailed in practically all of the other cities visited with the exception of Buffalo, Rochester, Utica and Syracuse. In these cities there are three family tenements and some of them have been licensed for homework.

Even in the few cities having tenements many varieties of work were found not appearing among the articles for which the law requires the house to be licensed. This fact adds another group of houses — no one knows how large — where homework may be carried on.

The following pages present some interesting side lights upon the conditions found among homeworkers in the up-state cities visited.

BUFFALO

In Buffalo little manufacturing was found in tenement houses. Though twice the size of Rochester, there is much less homework.

A button factory, closed at the time of inspection, at other seasons of the year has given out homework. A very small amount of finishing on men's clothing was being done by Italian women living on Front street in single dwellings or two-family houses. There is very little homework in the clothing trade in Buffalo partly because the plan of the city permits rear shops on almost every lot in certain districts. There are a very few homeworkers on buttonholes and hand-finishing outside of these shops. The manufacturers of clothing said they do not like home finishing because the work is not uniform. One of the manufacturers said

that one reason why there was little home finishing done in Buffalo is that such work does not pay as good a wage for as long a season as the canneries or work in the vineyards along the lake shore. Italian families go out as whole families to work in the canneries, leaving early in June and in some cases not returning until after Thanksgiving time. The cannery season and the clothing season come about the same time and the canneries can utilize all the little children in the sheds snipping beans, husking corn, etc., while in the clothing trade they can only be utilized in pulling bastings.

Some of the malt companies give out their bags to be mended. Women make 2 cents mending each hole, taking from 5 to 10 minutes to mend, depending on size. Women working 8 hours a day can earn from \$3.00 to \$4.00 a week.

A large concern manufacturing hooks and eyes in a neighboring town has a depot in Buffalo for distributing same to carders. These carders receive from 40 cents to 70 cents per gross for carding, according to size (each card containing 24 hooks, 24 eyes and 24 eyelets), the very small ones receiving highest prices.

Paper boxes are also made in the homes at certain seasons, but none were being made while the investigation was going on, although one paper box manufacturer openly advertised last spring at the Buffalo Child Welfare Exhibit that paper boxes were a well paid industry for children to enter into after school hours and on Saturdays.

NIAGARA FALLS — TONAWANDA — LOCKPORT

A hook and eye manufacturing company at Niagara Falls was found giving out carding to be done in the homes. Although the concern had only about ten employees busy in the factory at the time of the investigation, the superintendent said they had 1000 workers carding in their own homes during the year. Inspectors were furnished a list of 391 names and addresses, of which 79 were in Buffalo, 105 in Lockport, 207 in North Tonawanda and vicinity. The wage for carding was extremely low and the workers complained bitterly both of low wage and eye strain. In none of the homes visited in Tonawanda, Lockport, or Buffalo, do any workers earn more than 17 cents per day. One woman who had

been carding for six years, works 10 hours a day, and can make 80 cents in three and one-half days. She usually averages 18 cents a day, but if given a uniform size of work at 60 cents a gross can earn a little more. She formerly worked at night but had to give it up on account of eye strain. She says carding causes headaches. In order to card one gross she has to sew 144 times 24 hooks (3456 operations), 144 times 24 eyes (3456 operations), fasten in 3456 eyelets, or a total of 10368 operations for 40 cents to 80 cents according to the size of the material. Children were found carding. One child 5 years old was found actually sewing the hooks on the cards and the little children usually help by slipping the hooks through the eyes while the older members of the family do the carding. One woman in Tonawanda said that five years ago, when her husband was laid up on account of an accident, the whole family were carding and by working all day long from 7 in the morning to 10 at night, with the help of her husband and her daughter's assistance at night, when her day's work in the factory was done, she could sew seven gross a week. The forewoman knowing of her trouble kept her busy all the time. She averaged \$5.50 to \$6.00 a week throughout the winter. She says she is worn out from the strain of having done so much of this kind of work and that the nervous tension in carding is terrific. Another woman in Tonawanda, whose little girls were carding hooks and eyes to earn extra money, said she was not going to allow the children to do any more of it because it made them nervous and irritable. A woman who is more or less dependent on the work complains that in the winter time the workers have to spend two or three hours at the office waiting for work to be given out. Another woman, a swift worker, says she can make 60 cents in three and one-half days. One worker stated she used to pack medicine capsules at home. A wholesale drug house in Buffalo gave out to homeworkers bags of capsules to be packed in little boxes, one-half and one dozen to a box. This drug firm moved away from Buffalo and the woman began carding hooks and eyes.

ROCHESTER

A large variety of homework was found in Rochester. The only thing that prevents a repetition of New York conditions is

the fact that Rochester is not a tenement city. The instant it becomes hampered for space New York's homework problem will be repeated. Rochester was found to have more homework than any other up-state city with the exception of Gloversville where all the manufacturing is practically done outside the factories. This may be due to the fact that Rochester is a large clothing center and that manufacturing carried on there is largely light manufacturing adapted to homework. No extensive investigation was made of the homework in the clothing trade because this subject had been covered by the Federal Government Investigation of the clothing trade.

A hook and eye factory was found with 100 homeworkers. Lists of names and addresses of these were unsatisfactory. Few of them could be found at addresses given and none were found working.

A firm making trimmings and fringe, etc., had 40 homeworkers. This firm used to make celluloid collar supporters, at which a great many children worked. These supporters having gone out of fashion, work is no longer being done. Children are not used in making fringe.

Four button factories gave as maximum number of homeworkers 100; 138; 40; and 4. For carding buttons homeworkers are paid 2 cents to $3\frac{1}{2}$ cents per gross, according to the kind of button.

Mrs. A. is German. Her house is very clean and children well dressed. Mrs. A. has been carding buttons for three years. She usually works nine hours during the day and two at night. There are days when she cards for 18 hours. She is not at all well. Five years ago she was very strong. Feels that carding buttons has hurt her strength. She receives $1\frac{1}{2}$ c to $2\frac{1}{2}$ c per gross, 15 minutes is spent per unit. She has often been promised by the girl in charge of this work in the factory 3c per gross for rush orders but has never received above $2\frac{1}{2}$ c. She usually averages 25 gross per day. She has never earned more than \$4.50 per week, usually it is \$2.50 to \$3.50. "It ain't right and dem factories getting good money for buttons." Mrs. A. feels bitterly the small amount she is able to earn, but does not wish to run the risk of losing her husband's position, who sews buttons at the same factory where she gets her work.

Four necktie factories inspected use a total of 98 homeworkers.

Seven infant's shoe factories were visited, having 53 homeworkers. The little moccasin is cut out at the factory but sewing in the little leather tongue, running in the ribbon, and trimming, is all done by homeworkers.

Seven paper box factories were visited. Two had no homeworkers at this season of the year but have at Christmas time; one had 17; one 50; one 25; one 1; and one 3.

A drug novelty establishment making finger cots, wristlets, etc., had 9 homeworkers.

A notion company making all kinds of sanitary specialties, garters, etc., had no workers in the factory but had 79 homeworkers when inspected, and 100 at their busiest season.

Conditions in Rochester present one of the best arguments for extending a license system to private dwellings and two family houses as long as home manufacturing is permitted. With the exception of finishing of clothing practically all other kinds of homework go on in buildings which are not tenements and therefore are outside the jurisdiction of the present law.

UTICA

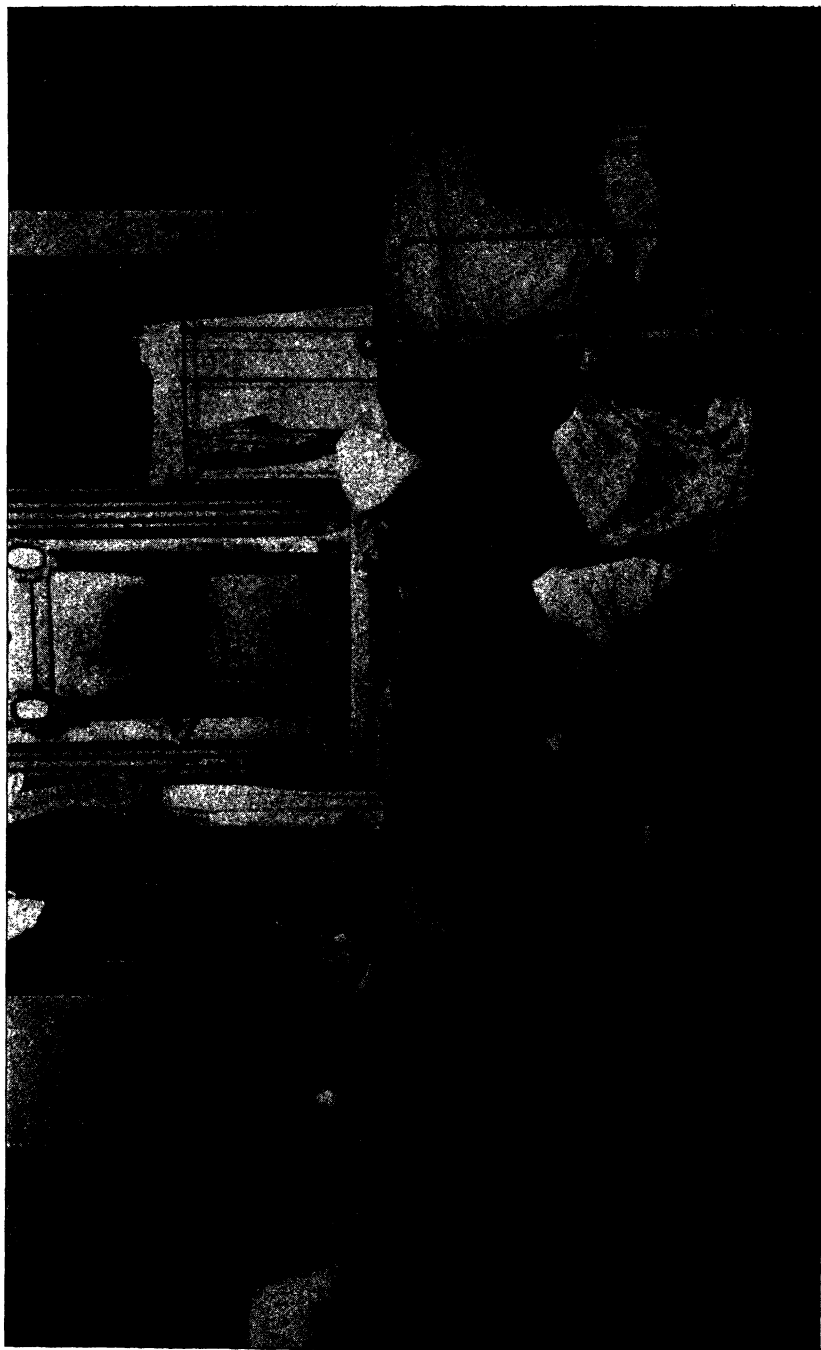
Finishing clothing and crocheting at tops of underwear and taping are done in the homes in that city. All this work is given out by one mill with 100 inside workers and 14 outworkers. In recent years a great deal of this work is being done by machine crocheters, and it is only special work that is done by hand. For this inspectors were told that women get 75 cents per dozen. Workers stated it took 12 hours to complete one dozen and they can make \$3.50 to \$3.90 a week working from 9 to 11 hours a day. Women receive 25 cents per gross for taping tops on shirts; 40 cents for tops on combination suits; 85 cents for necks and sleeves on summer underwear; average about 6 cents an hour.

LITTLE FALLS

Little Falls, like New York, is a tenement city. With a population of 12,273 it is already facing the congestion problem. Situated in a narrow valley about three-quarters of a mile wide, this city is hemmed in on two sides by towering hills. The river

flowing through the city furnishes the power for many industries. The topography, the limited water power and scarcity of land for dwelling purposes, encourage land speculation and make rents very high. Every available bit of space along the river bank is utilized for factory sites, crowding the houses used as homes by the workers back along the banks of the canal, which also runs through this narrow strip of land. Many of the houses are unsanitary. Houses which should be used for one or two families at most are converted into tenement dwellings in which four or five families with additional boarders crowd. It was in these little congested frame tenement houses that workers were found busily sewing fur and plush trimming on felt slippers. These slippers are cut and stitched into slipper patterns in the factory where the fur or plush is stitched by machine around the outside edge of the top. They are there tied in bundles of two and one-half dozen each and given to any outworkers applying for work. In the homes, the trimming is overhanded in the inside of the slipper. The price for this work was learned to be 16 cents per dozen pairs.

In one of the houses facing the canal three families were found working. The walls of the halls and stairways were in very bad repair, in addition to being filthy. In a rear apartment an Italian woman and little six-year-old child were at work. The workers were sitting on an outside porch overlooking a back unpaved court around which were several rear tenements and open privies. The woman, 28 years old, has been in this country only four years. She was working at highest rate of speed, and the day we called had been working since six in the morning and did not expect to stop until ten at night. The woman said she frequently worked that long, and never worked less than 12 hours a day when she had work. Sewing at that rate with the assistance of the little six-year old child she averaged 84 or 85 cents a day. This woman proudly showed the enlarged joints, the cuts and calloused places on the little six-year old child's hand as evidence of the child's work. Large bundles of finished slippers were piled on a filthy upholstered sofa near by. One of the boarders had used this sofa as a bed the night before, but the soiled bedding had not been arranged since the occupant arose. The apartment and sofa were full of vermin.



Frances A — Same family as in preceding photograph.

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

In another family in which a mother, father, four children and three boarders lived in four rooms, the mother showed her factory slip on which she was credited with \$6.22 for 15 days' work. This woman said she worked 9 hours every day and her little 12-year old daughter worked every day after school from 4 o'clock to supper time, and after supper for a couple of hours before going to bed, and all day on Saturday.

In still another home, in a back room of a little Italian grocery store, we found a tubercular mother and her little 10-year old girl sewing fur trimmings on slippers. The mother complained that the small particles of fur lodged in her throat and nose, making her cough all the time. Later a record was discovered which showed that this woman was a tuberculosis patient. This mother and little girl make 80 cents a week. It is not necessary for them to contribute to the family income, as the family owns the building in which they run the store, two houses and a bakeshop building.

One of the managers of a felt shoe factory, when told our errand said: "In Utica no one ever bothers the factories about these things. Why are we bothered this way? No, we do not keep the names and addresses of our homeworkers. Women wanting such work come in and get it and that's all there is about it." A man in this factory was observed by an inspector brushing and cleaning the slippers as they came in from the homeworkers. When asked why, he said: "We have to brush them very thoroughly; they come in with all sorts of dirt and things in them — too dirty to handle otherwise."

In Little Falls gloves were also found to be made in the homes. One firm manufacturing sweaters and knit woolen gloves has only 25 workers in the factory, most of whom are working on the knitted materials, and 100 homeworkers. The firm keeps neither names nor addresses of its homeworkers. The drivers or expressmen alone know where the gloves go in the outlying districts. The gloves are not delivered to Little Falls workers. They must call and return their own work.

A woman 35 years old has been making gloves ever since she was 11 years old. She is prematurely old, has lost all her upper teeth, and complains of nervous indigestion, and looks like a skeleton. This woman's husband is a day laborer

receiving \$1.65 per day, but his work is so irregular that she must work in order to pay their rent, which is \$8 for three ramshackle rooms. Working at the machine all day long from 7 in the morning until 8 and 9 o'clock at night, this woman can make 10 dozen pairs of gloves a week, for which she receives 18 to 45 cents per dozen pairs, according to style of gloves. (See process below.)

PROCESS OF GLOVE MAKING.

Make thumbs; sew back and front of hand part together. Stitch on canvas cuff. Insert forgeings. Sew up the fingers consisting of:

- 2 seams on first finger.
- 4 seams on second finger.
- 4 seams on third finger.
- 3 seams on fourth finger.

When all this stitching is completed the gloves are turned, each finger and thumb needing special turning on a stick. This turning is not counted in with this woman's output of work, as her husband always turn the gloves, bundles them (one dozen pairs to a bundle), and labels them for her. This woman complains of having a tired back all the time from bending over a machine. She said: "Time was when I could make 10 dozen pairs in two days and three hours, but I'm worn out now. I can scarcely make 10 dozen a week now."

All the glove workers in Little Falls told the same story of long hours and small pay.

DOLGEVILLE

Making felt shoes is the main industry in Dolgeville. Homeworkers, it was learned, trim the shoes, mostly in private dwellings. The homes are spotlessly clean and no one could possibly criticise either the sanitary condition of the homes or the wages paid the homeworkers. The skilled workers, most of them Americans or German Americans, said they can make anywhere from 20 to 25 cents an hour without speeding at their work. Many of them make \$2.00 a day without working more than 8 hours in any one day. One woman stated she never made more than \$11 a

week but that some made as much as \$16 and \$17 a week during the busy season. Another woman who had been working five years said she could make 22 cents an hour, day in and day out, making felt ornaments for slippers. The Italian homeworkers sew the fur trimmings on, receiving 24 cents per dozen slippers (12 pairs) and can make from \$1.00 a day up (in Little Falls workers only receive 16 cents for 25 slippers). One woman and her 13-year old daughter had made 3 dozen pairs in four hours the morning they were visited. The little girl was not a swift worker and could usually make two dozen in a day of 9 hours. The mother and daughter averaged 5 dozen a day all summer long. Pay-roll showed their earnings to be from \$7 to \$9 per week. Another woman makes from 3 to 4 dozen pairs a day. On the morning of the inspection she was sitting on the back porch sewing chinchilla fur on grey felt slippers. One of her little children whose face was broken out with impetigo was playing around among the slippers, and on one occasion rubbed the fur of one caressingly against her little face.

The manufacturers in Dolgeville were apparently making serious efforts to prevent any work being given out in homes where there is contagious disease. They keep in close touch with the doctors and the Department of Health, and are always notified at once if a case of contagious disease occurs in one of the families on their list of homeworkers. Impetigo, although a very contagious skin trouble, is not a dangerous one, and few Italians take their children to the doctor for treatment; therefore such cases are not reported.

The present factory law does not apply to this town at all. There is not a tenement house in the town, therefore no inspection is required. The manufacturers are doing the best they can, but even their best can not obviate all danger of contagion. Out of a population of some 1,500 there are between 75 and 100 homeworkers.

GLOVERSVILLE

There was time for only a very brief survey of Gloversville, which deserves a separate study.

Three factories were visited. One of the owners said the homework went all over the town — out to Johnstown, St. Johns, Fort

Plains, and out into the mountain regions. Drivers or expressmen take the materials out and they alone keep names and addresses of the workers. Some of these drivers give out large quantities to other drivers in isolated districts who send the materials still further out to no one knows where. The worker pays the driver or the expressman. One firm said to be a prosperous one had a very small plant. The owner volunteered the information that he had \$40,000 worth of stock in his small quarters. "You see all our work, which would take up so much room and make us look like a New York factory, goes away out into the homes. Why, if we made our gloves inside our works, Gloversville wouldn't be big enough to hold the factories. We have some 90 factories here. A couple of cutters can keep from 50 to 75 homeworkers busy. Why, we teach glove making in our public schools. We have glove making machines in the vocational classes there, so when children come out they are equipped to enter the trade." A number of manufacturers pay for the equipment and give the material for the making of gloves in the classes, paying their regular rate of payment for work for all gloves coming out from the schools that come up to the standard. The schools in turn use this money for more equipment.

Another manufacturer said:

"The women in Gloversville do not seem to be as strong as they were some years ago. We used to have strong healthy people here, but nowadays when a woman reaches 25 or 26 years of age she is worn out. She can't begin to do the work women of that age used to do. I think that it is because they begin work too early. Children of nine and ten years make gloves, and you know and I know that children beginning work at that age are pretty well worn out by the time they are 25 years old."

TROY

Thirty factories in all were inspected in Troy to secure lists of homeworkers: 4 brush and mirror factories, employing 94 female factory hands and 587 homeworkers; 25 collar, cuff and shirt factories, employing 11,629 factory hands and 3,814 homeworkers; 1 factory manufacturing net shopping bags, which sends work to the homes occasionally. In these factories lists showed

that 4,401 or 27 per cent of the total employees are homeworkers. Of the thirty manufacturers, nineteen keep complete lists of homeworkers and four permitted women working in the factory to take work home after factory hours.

Homework on Collars:

Forty or fifty years ago collars were made entirely by hand and there were no factories. The firms engaged in the collar business had rooms where they received the work and gave it out to be done in the home.

At present the chief work done in the homes is turning, but some pasting and a little machine sewing is also done there. Hand buttonholing is sometimes done by outside workers, though by far the greater part of the buttonholing is done on machines in the factory. A collar turning machine is being used in factories more and more, and as a result the amount of work given to homes is decreasing.

The collars which are given out for turning are sewed or run on machines in the factory and then sent to the forewoman for distribution among the homeworkers. The work is carried to the homes and back to the factories by "collar express" and the worker pays the express 50 cents a week for doing the carrying. Sometimes a collar expressman will own a single horse and wagon, sometimes he will own several wagons, but in any case each wagon has its regular route. Once in a while it happens that a woman gets collars from two different factories and has to pay two collar expressmen for delivering the work. No matter how near to a factory an outworker lives, the collars always pass through the hands of a collar express.

Turning collars while apparently an easy operation requires as a matter of fact a good deal of skill. It is very unusual to find children who turn, partly because of the skill required and partly because most of the women who turn take pride in the fact that their children do not know how to turn collars. Many women in apparently comfortable circumstances do this homework. In several cases where there was apparently no economic necessity for turning collars I asked women why they did it and the answer

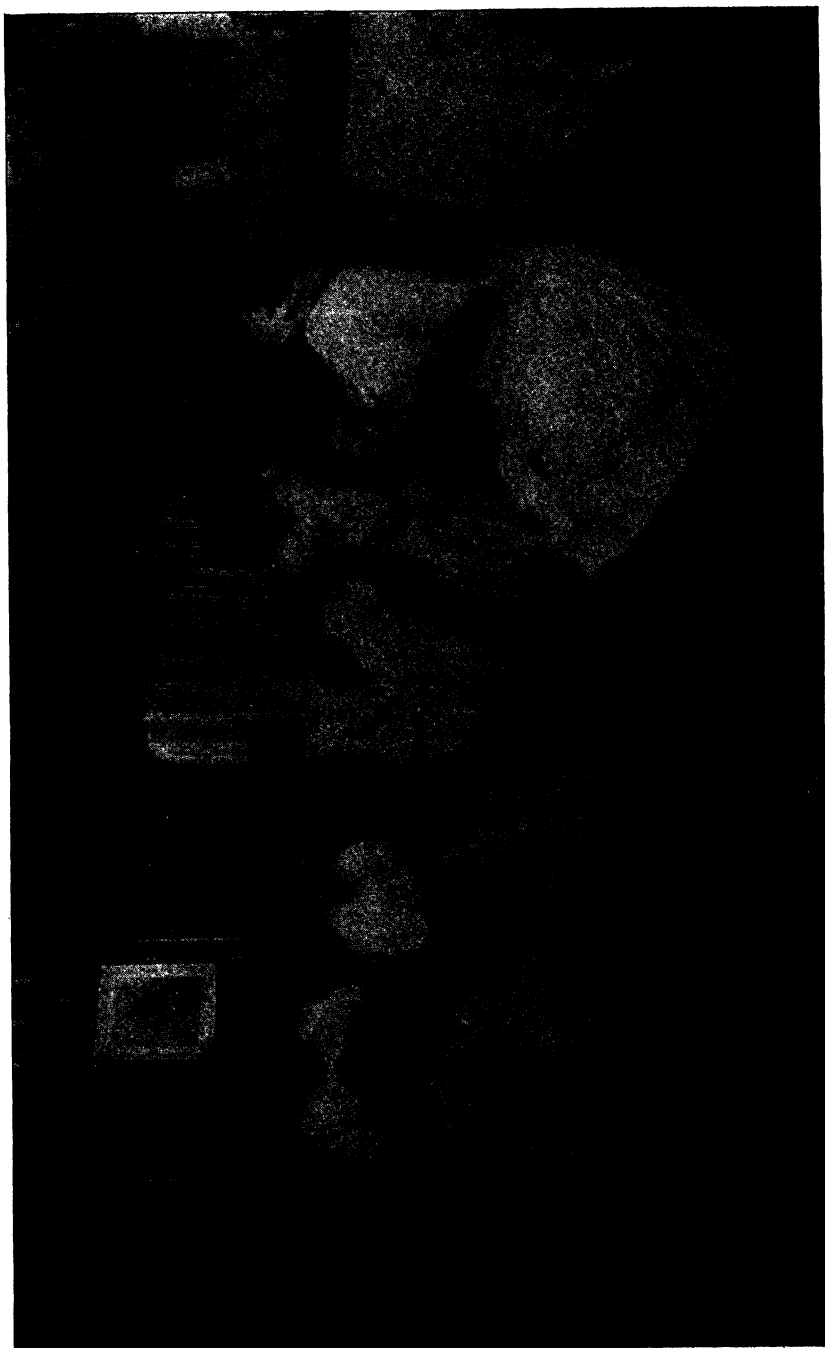
was, "I'm so used to turning that I miss it when I don't have to do it."

Many turners told the inspectors that wages are getting lower and lower. Some blamed the Armenians, but a more reasonable explanation may be found in the fact that the work is sent out into country districts where labor is cheaper. Many of the factories reported having branches in smaller places where they get work done cheaper than they can in Troy.

Brush Making in North Troy:

Thirty or forty years ago brushes were made extensively in North Troy, or Lansingburgh, as it was then called. Of late years the industry has declined, but even now the output of brushes is said to be very large. Formerly it was said that a large proportion of the children worked at brush drawing at home, and among the old workers I frequently heard the saying that children used to be born in Lansingburgh with a brush in their hands. As a matter of fact, I have found women past fifty years of age working in their homes at brush drawing, who assure me that they are absolutely unable to remember when they learned to draw brushes. They have been at it literally ever since they can remember. The kind of brush work they do is not so hard on the eyes as the Universal brush work. The wooden back with holes drilled in it is held in a vise. A loop of wire is then drawn tight, for the purpose of securing the bristles. Long practice makes it possible for the workers to take just the right number of bristles without watching closely. The holes in the back of the brush are very much larger than those in the rubber pads of the universal brushes because a bunch of bristles goes into each. Prices vary with the kind of work and in the different factories, but run generally from 2 cents to 4 cents a hundred bales. Children do not learn to draw brushes now and I have found no cases where they worked at it. I have found that people who draw brushes as children take pride in the fact that their children have never done any drawing.

There seems to be a general feeling that the pay is extremely low, but women who are not obliged to work do much of the drawing.



Father has been ill for several weeks. Mother and 3 children are crocheting bags. Mary, 14 years old, stays out of school; Carmella, 12 years old; Jennie, 10 years old. Children work about 4 hours on week days. Average in all 16¢ per day.



SUMMARY

The data secured in up-state cities tends to confirm the conclusions reached as a result of the investigation of homework in New York City. As in the metropolis certain conditions were found common to all places where work went into the homes; low wages, period of intense overwork for rush orders offset by long periods of idleness, while certain others were found common only to the trade involved. Child labor was found in every trade where it could be utilized, and in the few trades where more skill was necessary than could be furnished by children, they were used to carry the material to and from the factories. Conditions of night work, uncleanness and disease, excessive speeding at some seasons of the year, and meagre compensation were all brought to light in this up-state investigation.

The outstanding and distinctive feature of home manufacturing as found in up-state cities is the sending of the work to homes in one or two-family houses. The existing law, as already pointed out, cannot reach this work in any way. Thus thousands of homes, unless the law is amended, will continue to be factory annexes wholly unregulated as to sanitary or other conditions.

CHAPTER VI

THE LICENSING LAW.

The New York tenement house homework law, known as Article VII, §§ 100-105 of the labor law, was enacted in 1892. It was the result of an effort to regulate to a slight extent certain forms of homework, in accordance with the decision of the Court of Appeals which, in 1885, in the Jacobs case (98 New York, 98) held unconstitutional a statute prohibiting the manufacture of cigars in a tenement house.

Licenses:

In the belief that, under the decision in the Jacobs case, tenement homework could not be sweepingly abolished, the legislature has provided in this Article of the labor law — as repeatedly amended — for issuing state licenses for manufacturing 41 specified articles in tenement houses upon certain conditions. The first condition is obedience to the sanitary code and building law, clearly indicated for a given tenement house by the records of the local board of health and of the tenement house commission, in each city of the first class. Tenement workrooms are, however, exempt from all other provisions of the labor law.

A tenement house is one having three families cooking separately. One and two-family houses are exempt from the licensing provisions of the labor law.

Exempt also are all houses of all kinds in which people work upon articles not enumerated in the list of 41 articles specified in the statute.

A license is granted by the State Department of Labor to the landlord or his agent for the whole house, if at all, not for the separate worker, or family, or apartment. It is issued only after examination by the Commissioner of Labor of the records of the local department of health and tenement house department. If these records show that there is, in a certain house, any infectious, contagious, or communicable disease, the Commissioner of Labor may, without inspecting the building, withhold the license until the records show the required sanitary state of the premises.

Then, before issuing the license, the Commissioner of Labor must visit, inspect and record in permanent form in his office his findings as to the satisfactory condition at the time the license is granted.

Articles for the Manufacture of Which in Tenement Houses Licenses are Required:

Licenses are required for only 41 articles as follows: Coats, vests, knee-pants, trousers, overalls, cloaks, hats, caps, suspenders, jerseys, blouses, dresses, waists, waist-bands, underwear, neck-wear, furs, fur trimmings, fur garments, skirts, shirts, aprons, purses, pocket-books, slippers, paper boxes, paper bags, feathers, artificial flowers, cigarettes, cigars, umbrellas, or articles of rubber, macaroni, spaghetti, ice cream, ices, candy, confectionery, nuts or preserves.

The Court of Appeals, in the Jacobs case, held unconstitutional a former statute on the ground — among others — that it discriminated by prohibiting the manufacture of tobacco alone in tenement houses. Under the present licensing law far more industries carried on in tenements are omitted than are included in its provisions. This law is in a high degree discriminatory.

The list of articles for which a license is required covers only a small fraction of the whole number of goods made in tenements. All articles not enumerated in the list are exempt from the requirement that they be made in licensed houses.

There are now in force 13,000 licenses covering 20,446 home-workers. Of this number 5,146 are employed in small shops in rear tenements which come under this section of the law, leaving altogether 15,300 people working legally in tenement houses.

Revocation of License:

A license may be revoked if, in the opinion of the Commissioner, the health of the community or of the employees so requires, or if the owner fails to comply with the orders of the Commissioner. After revocation, a new license must be issued before work can be legally resumed, and all the same official preliminary precautions taken as in the case of the original license.

Monthly Bulletin of Department of Labor:

For the convenience of manufacturers and homeworkers, the Commissioner of Labor issues monthly bulletins giving the street and number of each licensed house, with a list of houses whose licenses have been revoked, and of those under investigation as candidates for licenses, and, finally, a list of those whose applications have been denied. This Bulletin is intended to enable manufacturers to know accurately the addresses to which their goods may and may not legally be sent, and to inform homeworkers whether or not they can legally work in their dwellings.

Inspection of Licensed Tenements:

Licensed tenements are to be inspected by the Commissioner of Labor once in six months, and the owner notified to remedy any violation of the conditions upon which the license was granted. Where a room or apartment is found to be habitually filthy, the Commissioner may affix to the entrance door a placard calling attention to the fact and prohibiting manufacture of any of the listed articles therein. Licensed tenements must be kept clean and free from all vermin and infection.

None of the 41 articles listed can legally be worked upon in a room or apartment in a tenement house where there has been a case of infectious, contagious or communicable disease, until the local board of health certifies that the disease has terminated and the apartment has been properly disinfected.

No cellar can be used for producing any of the listed articles. Rooms used for homework must be well lighted and ventilated and contain at least 500 cubic feet of air space for each person working therein.

Exemptions of Dressmakers and Tailors:

No person may do homework in a tenement dwelling who is not a member of the family living in it. An exception is made for dressmakers working on the ground floor or second floor, solely for the custom trade, in premises regarded by the Commissioner of Labor as *in the highest degree sanitary*, and affording 1000 cubic feet of air space per worker, with no children under

14 years of age living or working therein. In these cases a special permit may be issued.

A tailor or seamstress may be employed by any family for work for the family, and a shop needs no license if it is on the ground or main floor with separate entrance to the street unconnected with living rooms and entirely separate from the rest of the building by closed partitions without any opening whatsoever and not used for sleeping or cooking.

Register of Persons to Whom Work is Given:

Any person who gives out material for any of the 41 listed articles must keep a register of the names and addresses plainly written in English of the persons to whom the goods go; and must, before sending them, ascertain from the office of the Commissioner of Labor whether the tenement house to which the goods are sent is licensed. The owner of the goods must also ascertain from the department of health whether there is sickness in the house. No goods can legally be sent to an unlicensed house, or to a room or apartment in which there is any infectious, contagious or communicable disease. The register thus prescribed must be open to inspection by the Commissioner of Labor, and a copy of it must be furnished on his demand with any other information that he may require.

It is the clear intent of the law that manufacturers shall have for themselves in these registers, and shall furnish to the Commissioner upon his request, exact knowledge as to the presence of their goods in the tenements. But it is not mandatory upon the Commissioner to demand copies of these registers, or upon the owners of goods to send them to him except upon demand.

Goods Found Under Illegal Conditions:

Articles produced contrary to the licensing provision cannot legally be exposed for sale. The Commissioner may affix to them a label containing the words "tenement made" on a tag four inches long, or may seize and hold them until they are cleaned or disinfected at the owner's expense. The label thus affixed can be legally removed only by the Commissioner.

The Commissioner is required to notify the person described by the homemaker as the owner, that the goods have been labeled and seized. After a month, goods may be destroyed if the owner has made no provision for them to be cleaned or disinfected.

If the Commissioner finds evidence of disease in a workshop or tenement workroom where any of the 41 listed articles are worked at, he is commanded to affix the label and to notify the local board of health to disinfect the articles if necessary and then remove the label. If the local health authority makes such a discovery it is commanded to notify the Commissioner of Labor, and its records must be open to him at all times. It has power to condemn and destroy goods made under unclean or unhealthful conditions.

The owner or agent of a tenement house may not permit it to be used contrary to these provisions. When work is illegally done, notice is to be served upon the owner or agent, who must then either stop the work within ten days, or begin proceedings for the dispossession of the occupant within 15 days, and the unlawful action of the tenant is a cause for summary proceedings by the landlord or agent.

Extent of Homework:

Some houses are licensed because regular homeworkers live and work in them. Other houses are licensed in order that people who work by day in factories and workshops may carry work home to be done at night, or on Sundays, or legal or religious holidays, without violating the licensing law.

It is impossible to ascertain what proportion the licensed homework legally done bears to that for which no license is required, and to that done illegally without a license when one is required. The number of kinds of goods made in tenements is shown in the appended list of articles found during the investigation. The articles omitted from the list for which licenses are required are conspicuously more numerous than the listed articles.

The number of homeworkers employed upon goods for which no license is required appears, also, to be vastly greater. Thus the lists of homeworkers kept by manufacturers of exempt articles for their own use in their own offices indicate the employment

of more than one hundred thousand such workers — the embroidery trade alone employing about 51,500 homeworkers. A conservative estimate for Greater New York City would be about 125,000. This does not mean that 125,000 homeworkers would be found at any one census. It does mean a year's careful following up of a correct registry kept by all manufacturers giving out any kind of work, whether embraced in the list of 41 articles or not.

The manufacturers' own lists of home addresses of their homeworkers are rarely correct. Addresses obtained from them by the investigators were amazingly incorrect. In some cases no such house numbers were to be found. When the houses were located, the greater proportion of names had never been heard of and, in about ten per cent of the addresses, the person had lived at such address some two years back. In many cases the manufacturers knew nothing of the homeworkers, leaving such matters to the forelady or foreman. Sometimes the person in charge of giving out work had the address, but most frequently not. In other cases a voucher system is used, a number, or perhaps the woman's first name, is entered on the slip, the number of pieces of work given to her and the date. When the work is returned, the woman receives her pay, and the voucher is destroyed, thus saving all trouble of keeping either a registry of names or a pay roll.

In many instances, as in the flower trade, the manufacturer or forelady consults the monthly bulletin issued by the New York State Department of Labor to see if a given applicant lives in a licensed house. When the homemaker's address is listed in the bulletin, the work is given to her, she is registered in the employer's book by number, and never again is an inquiry made as to her place of abode, although she may have moved a dozen times since the first entry, or, as is frequently the case, a friend or even a friend's friend may now be taking out work under the original number entered.

The firm usually does not enter on the pay rolls the amount paid shopworkers for work done off the premises; the pay rolls, therefore, afford no clue to the extent of this form of homework. Many manufacturers acknowledge that their factory hands take work home at night, but frankly say that they keep no separate

registry of such workers. Ninety per cent of the embroidery workers in factories or shops take work home at night, or over Sunday, during the months of October, November and December.

Besides the licensed work, and the work for which no license is required, in the tenements, much material is sent to houses occupied only by one or two families. This, also, is homework. It is legally beyond the supervision of the Department of Labor.

An inspector of the Department of Labor up-state reported that when she advised an owner of a house, in which three or more families lived, of whom some were taking in homework, that he must obtain a license for the house, the owner or agent invariably made the homeworkers stop work or move out.

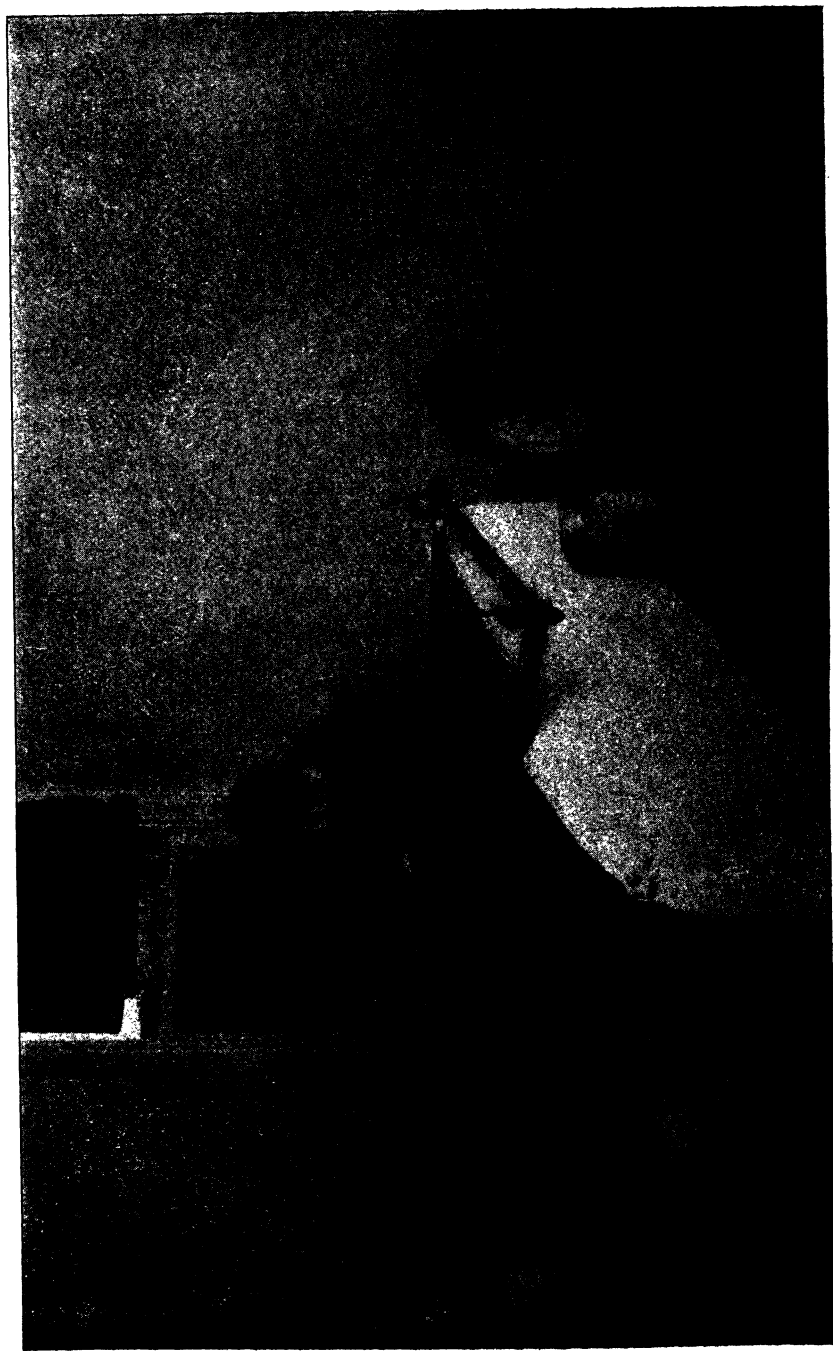
In instances where the inspector filed a complaint against licensed houses, the same result occurred. Thus the dwelling was changed to a two-family house, *i. e.*, exempt from law and inspection of any kind. The remaining occupants had their rents raised, to make up the amount lost by the removal of the third. In the rapid growth of the smaller cities and towns, small houses become two or three-family houses or tenement houses, before anyone is aware of the situation. Homework may go on in them until it is accidentally discovered by the Labor Department. This has happened, for instance, in Little Falls, where glove-making and slipper trimming go on in small unsanitary tenements.

Insufficient Number of Inspectors:

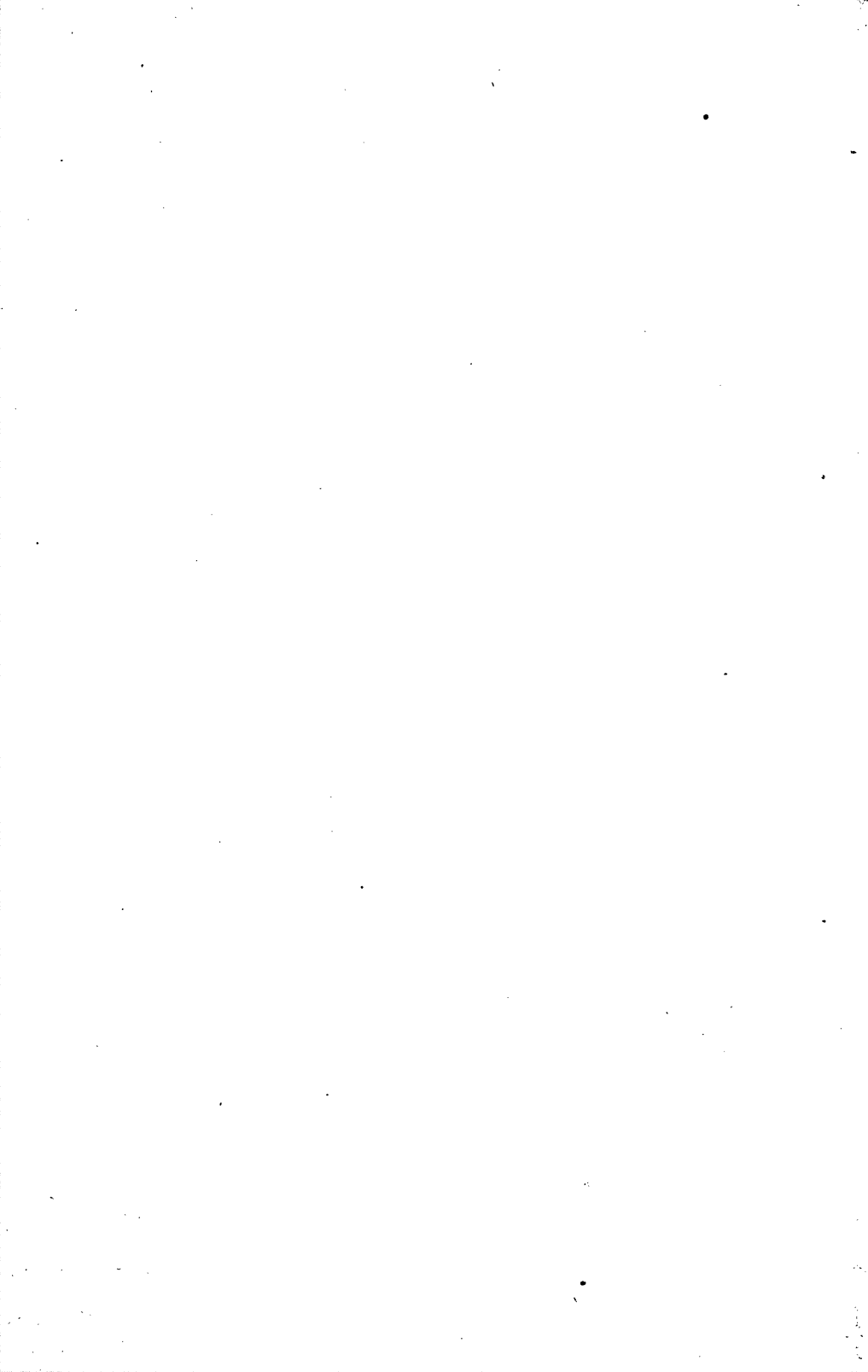
To enforce all the provisions of the homework law to the letter, there would be needed several thousand inspectors, and the work of inspection would have to be continuous throughout the day and night, and on Sundays and legal and religious holidays, because the work is continuous.

Inspections are, however, made only from 9 A. M. to 3 P. M., at a time when children are in school, and there is the least probability of finding overcrowding in the tenements. Older working members of the family employed in other occupations are during these hours usually away at work, and lodgers are not apt to be found asleep in this part of the day.

How then can the present inspection be adequate or efficient with only eight or ten inspectors assigned to an annual inspection



Small dark bedroom. 6 children and 5 adults live in 3 rooms, which are decidedly dirty and overcrowded. Girl at window is embroidering chiffon shirtwaist front. Gets 28¢ per waist. Spends 2½ hours on each.



of 13,000 licensed houses, to investigate new applications and re-inspect the houses in which licenses have been revoked? With the most conscientious work on the part of the Labor Department, there must remain a tremendous number of places unvisited. Yet the statute provides that all licensed houses shall be visited once in six months.

Even when a tenement is inspected once or twice a year, the sanitary conditions can so change in two hours, two days, two weeks or two months as to make it a totally different place from the one granted a license. The revoking of licenses on account of unsanitary conditions becomes a farce unless an inspector camp day and night on the doorsteps of each house for which a license has been revoked. We found a house in which halls and stairways were so dirty that the license had been revoked by the Department of Labor. However, of the twenty-two families in this house, 8 were working on feathers. When the investigator walked into this tenement, the housekeeper was evidently watching to give warning to the inmates. She followed the investigator and asked if she came from the State Labor Department. On receiving a negative answer, she offered no objection to the investigator going through the house, warning her, however, to keep away from the top floor, because a man there had "a very bad disease." Three days later this same case was reported to the Health Department as chicken pox. Even should the people in this house decide not to bother with hiding their materials every time a stranger approached, all they need do when their license is taken away from them is to obtain some other kind of work which does not require a license.

Article VII, Part IV, Section 100, of the State Labor Law says: "None of the articles specified in this section shall be manufactured, altered, repaired, or finished, in any room or apartment of a tenement house, where there is or has been a case of infectious, contagious, or communicable disease, in such room or apartment, until such time as the local department or board of health shall certify to the Commissioner of Labor that such disease has terminated and said room or apartment has been properly disinfected."

The following instances show the way in which homeworkers break this section of the law.

One family was found running ribbons and sewing buttons on corset covers. The father has had tuberculosis for several years. He had just been sent away to the country. The house had not been fumigated, and the family were still working. Moreover, they were working all the time that the father was ill.

In another house, where four members of the family had been sick with typhoid, and one was just convalescing, the family were working on feathers. Mary had been doing the work all through the time of her convalescence.

In another house, a young woman, whose father had been sent away to a tuberculosis hospital, was working on dolls' clothes in the same room where her sick father lay. The Charity Organization had refused this young woman further assistance unless she also would go to a tuberculosis hospital. She refused to do this, and is working day and night on the dolls' clothes with tuberculosis going towards its final stages.

In another family visited, the mother was out. The daughter went upstairs for her, followed by the investigator, who saw the mother come out of an apartment on the door of which the Board of Health had posted "Diphtheria." When the mother had returned to her own apartment, she fell to work on the willow plumes which were lying on the table, near a pile of clothing. After the interview she went upstairs again to the supposedly quarantined apartment. In the same house were four apartments in which there had been diphtheria since September, 1912 (investigation made November 9, 1912).

Among homeworking families, we find very frequently impetigo, a loathsome skin trouble, which is extremely contagious, and practically due to dirt. A child, whose face and head were sore with this eruption, was seen playing with a felt slipper. In another instance, a child was lying in a bundle of finished clothes, while in a third case a little girl suffering with impetigo was picking nuts.

Happening into an apartment where a woman was making passementerie, her boy was found in bed suffering with measles.

Another sad instance is that of Beatrice, 15 years old. She is crocheting buttons. Her mother says Beatrice has had a cough ever since she was a baby "so we do not make her work very hard. The doctor says that she will die when she is twenty years old."

In Rochester, a tenement house full of Italians were finishing clothing. The house was clean enough, but a visiting friend had a baby with her who was ill with the whooping cough. No effort was made to keep the baby away from the clothes. While it cannot be proved that whooping cough can be carried in clothes, few mothers would willingly buy goods thus exposed.

Child Labor:

Article VI, § 70, provides: "No child between the ages of 14 and 16 years shall be employed, permitted or suffered to work in connection with any factory in this State, unless an employment certificate as provided in this Article shall be obtained."

Children working at home are entirely exempt from this law.

It is no uncommon sight to find four and five-year old babies making flowers. Little Camilla, only three years old, was found in the afternoon of November 12th running ribbons in corset covers. Rosie, her 11-year old sister, was taking care of the baby, while Elsa, age 6, and Camilla helped mother. With the help of the two little ones the mother can make 5 and 6 cents an hour,—working 8 hours a day, makes about 40 to 50 cents a day. The rate of payment is 3 cents per dozen for ribboning, 3 cents a dozen for buttons on a dozen corset covers (6 cents a dozen for ribboning and sewing on 36 buttons).

The State Labor Law, Section 77, provides as follows:

"Hours of labor of children, minors and women.

1. No child under the age of 16 years shall be employed or permitted to work, in or in connection with any factory in this State, before 8 o'clock in the morning, or after 5 o'clock in the evening, of any day, or for more than 8 hours in any one day, or more than 6 days in any one week."

Children Employed in Homework Are Exempt from this Law:

During rush seasons all the children in homeworking families are pressed into service. Some little children, writing about their working day, are quoted below:

Angelina says: "When I go home from school I help my mother to work — I help her earn the money — I do not play at all. I get up at six o'clock and I go to bed at ten o'clock."

Camilla, 9 years old, says: "I have no time for play, when I go home from school, I help my mother. Half hour I make my lessons. Every morning I get up at 6 o'clock — I go to bed at 11 o'clock."

Giovanna. "I get up at 5 o'clock in the morning. Then I work with my mother. At 9 o'clock I go to school. I have no time for play. I must work by feathers. At 10 o'clock I go to bed."

Maria. "I have no time for play when I work by my mother, but when I don't work, I mind the baby and clean the house."

Little 9-year-old Antoinette told me, "I earn money for my mother after school, and on Saturday, and half day Sundays. No, I do not play, I must work, I get up to work at 4 o'clock in the morning, I go to bed at 9 o'clock."

Michaelina is not quite 14 years old. She crochets Irish lace. She gets up at 5.30 every morning, prepares her father's breakfast, crochets one hour before going to school, works again two hours after school, and takes care of the baby. Pasqualina, her sister, is 12 years old. She gets up at 6 o'clock and crochets an hour and a half every morning before going to school, and three hours every day after school. It takes two and a half hours to make one yoke for which the children receive nine cents, but as each yoke takes a spool of thread, two and a half cents is deducted from the profits. Working together the two children make 25 cents a day.

Francesca, 12 years old, works from 3.30 P. M. to 9.30 P. M. crocheting slippers. Even her little fingers can make eight or nine slippers in six hours. (These are children's slippers, and it takes from one half to three-quarters of an hour to make one slipper.)

Nicolina is 9 years old. She cuts embroidery four hours every day and two hours at night. Little Pasqualina, her

8-year-old sister, helps too, and together they can make \$2 a week.

These children work from 8 P. M. to 6 P. M., and from 7 P. M., to 10 P. M.

The Education Laws of New York demand the attendance of every child between the ages of 6 and 14 years in the public schools. Homeworkers constantly break this law. Children doing homework stay out of school. Emily C—— makes collars and cuffs; she was found at home during school hours by one of the investigators. On another morning she was met in the street, carrying completed work to the contractor. Again, 7-year-old Spendora was kept from school the day the investigator visited her house, so that she might cut embroidery.

Overwork of Women:

The State Factory Law says:

“No female minor under the age of 21 years, and no woman shall be employed, to work in any factory in this State before 6 in the morning, or after 9 in the evening, or for more than 9 hours in any day.”

Homework provides means by which the employers can escape the penalty of fine for keeping their inworkers employed beyond the day limit.

One of our investigators, visiting in a factory a few nights ago, after 5.30 P. M., found a forewoman doing up bundles of work. She frankly said it was work for the hands to take home, and that, at this season, it is impossible for them to do all the work without taking it away from the factory. The 54-hour law prohibits such work being completed after hours in the factory or workshop. A large number of manufacturers in one industry, when questioned regarding the rush season, showed that 90% of their shop hands are obliged to take their work home at night.

Some Italian girls, who work downtown in a bathing suit factory, are in the shop from 8 A. M. to 6 P. M. They return home for supper, and begin to crochet slippers, working on until 10 and 11 o'clock at night. Cases of workers who toil in the factories by day, and work in the wee hours of the night on homework, are

constantly coming to our notice. This frustrates the intent of the 54-hour law, leaving a most tempting avenue of escape open to the employer.

Section 77 of the Labor Law prohibits females from working more than 9 hours in any one day in one factory; and where a woman or girl is employed in 2 factories, the total number of hours must not be more than the total number of hours per day in a single factory; but this law does not apply to work done in the home where workers can do work to any hour of the night.

On December 3, at about 9.30 o'clock in the evening, the investigator found a 17-year old girl on Sullivan street, who is working as a bookkeeper in a factory by day, helping her mother run ribbons in corset covers and sewing buttons on same. When asked if she did it often, she said whenever the boss ordered a lot of work done by the next day.

A few months ago, at 5 in the afternoon, we found a mother and a 7-year-old child carrying a large bundle of underwear. When questioned we found that it contained 40 gross of corset covers which had to be finished for the next morning at 8 o'clock. A subsequent visit proved that the little girl worked until 11 o'clock that night and the mother until 3 in the morning. The rate of wage per hour for this work is so small and so meagre that it is not worth human effort.

Cigarettes:

Among other industries we find tubes and cases for handmade cigarettes being done in the homes. We are told by the manufacturers themselves that the handmade cigarettes are done after factory hours.

One hundred families have been interviewed who follow this trade. The workers are Greeks with a few exceptions, men mainly, although some were married and assisted by their wives. The men worked in factories by day rolling the tobacco and filling the cases at night. About 1,000,000 of these cigarettes are turned out every week, all of which are done in the homes.

We have found receptacles in which the paste is kept very dirty, and then the workers licking the edges of the paper after the paste has been applied. When the paste is dried too quickly it has to



Tenement house, East 114th street. Apartment, second floor rear, right. Making hose supporters. Mother; Gertrude, 15 years old; Sophie, 13 years old; Morris, 12 years old. 90¢ per gross. Working in congested quarters in the kitchen.



be moistened and they do it by licking. This is no exaggeration and did not apply to one case only. Homes in which the work was done were frequently dirty, food lying around exposed to the trade material.

An Exempt Trade:

One of the large homeworking trades in the city is the crocheting trade. Angora caps, sweaters, infants' booties, sacks, every thing possible for babies' wear, are given out to be made in the homes. One of the manufacturers gives work to 2,000 homeworkers. Many of these do not live in New York City. Another manufacturer gives out work to 600; another to 250. Crocheted articles do not appear on the licensed list and are therefore not subject to inspection. No one knows where this work comes from or whither it goes.

Widows:

The cry that homework is the prop and salvation of widows and orphans is not corroborated by the findings of the recent investigation. Of 301 families tabulated, less than 14% of the women workers were heads of families,—nor were they all widows, for in the 14% were included the single, the divorced, deserted, separated and a few more whose husbands had returned to their native land on account of illness, etc., and also a few whose husbands have become incapacitated as wage earners.

FINDINGS.

It is the obvious intent of this law to protect the public against disease and vermin, and to enable the Department of Labor to enforce a minimum of sanitation for the benefit of the workers, and to maintain for these purposes a continuing supervision of 41 specified industries carried on in tenements. None of these ends is, however, attained. Furthermore, by legalizing homework the licensing law breaks down other provisions of the labor law and also the compulsory education law.

1. Disease and vermin are found where work is carried on, and the public is not protected against them.

2. The compulsory education law is frustrated, children work undetected at home who should be in school.
3. The child labor law is frustrated in regard to the age and hours of labor of the children, and their working at night. Children under 16 years of age cannot work after 5 P. M. in a factory. They can legally work unlimited hours for any manufacturer in their homes.
4. The 54 hours law is frustrated when women who have worked in the factory nine or ten hours are given work to do at home.
5. New tenement homework industries, not enumerated in the list, have sprung up from year to year, and the listed industries constantly spread to new regions, unannounced and unknown to the Department of Labor, which consequently has not supervised them.
6. The vastness of tenement homework and the shifting nature of the homeworking population has made the dual task of supervision and enforcement impossible for the existing staff of inspectors.
7. Persons not members of the family cannot be discovered when they visit from one tenement dwelling to another, illegally carrying their work with them.
8. Offenders against the law are not adequately punished because in the nature of the case their offenses cannot be detected.
9. The attempt to enforce the statute has saddled upon the community a continuing expense for the salaries of inspectors, incurred in the effort to do that which in the end has failed.

CHAPTER VII

EMBROIDERY HOMEWORKERS IN NEW YORK CITY

BY

EDWARD F. BROWN

*National Child Labor Committee**

INTRODUCTION

The purpose of this inquiry was to ascertain the conditions under which embroidery homeworkers toil, with special reference to wage standards in this industry.

THE PRECURSOR OF THE AMERICAN HOMEWORK EMBROIDERY SYSTEM

There recently developed on the easterly side of the Borough of the Bronx an extensive manufacturing of machine-made embroidery. These manufacturers are the skilled workmen who migrated from the Cantons of St. Gallen, Switzerland, and Plauen, Saxony. The immigrants from Plauen are the more skilled workmen in the finer laces, while the St. Gallen workers at home produce approximately 75 per cent of foreign machine-made embroidery. The transplanting from Saxony and Switzerland to America of this industry is of comparatively recent origin. The cottage homeworking system which prevails in Germany gradually found its way into St. Gallen. In the Swiss home, the housewife, the husband, and frequently the children toiled at the Schiffl machine which weaves the intricate designs onto the solid linen. The cottage was the combined factory and home of the foreign factory embroidery worker. The products of these home factories were sent to one central selling point from which they were distributed.

The recent immigrant invasion brought to America numbers of these skilled embroidery workers. Here they attempted to set

* Being the results of a special investigation of homework in the embroidery industry in New York City conducted for the Commission by the National Child Labor Committee in January, 1912.

up the same system of a combination home and factory as prevailed in their native land. This, of course, was impossible under our factory legislation, because in the making of embroidery, the large Schiffli machine is essential. So these little embroidery shops, detached from the homes, were established and as a substitute for the household group the owner of the manufactory sent out the scalloping work to be done in the neighboring homes.

OF WHAT THE EMBROIDERY HOMEWORK CONSISTS

The designs of embroidery are woven onto solid linen. After the design is finally set into the linen, the superfluous cloth must be cut away, so that the edge of the embroidery is the fancy scalloped one. Just as soon as the hundreds of yards of the embroidery are taken from the machines, it is sent to the homes to be cut out, after which it is ready for marketing.

THE EXTENT OF HOMEWORK IN THE EMBROIDERY TRADE

It is difficult to estimate, with any degree of accuracy, the number of persons engaged in homework on machine-made embroidery. One factory alone sent work into 90 homes. The classified telephone directory for 1913 lists no less than 630 embroidery establishments in New York City. Of course, a large number of these, perhaps, do no work requiring the services of home laborers, as many of these deal exclusively in hand-made embroidery. Others, perhaps, are retailers of this class of goods. On the other hand, a large number consists of a small Schiffli machine embroidery establishment, each having a few families, from 5 to 20, on their lists who are available for homework.

NATIVITY OF HEADS OF FAMILIES IN WHICH HOMEWORK IS
CARRIED ON

TABLE NO. 1.

SHOWING NATIVITY OF 95 EMBROIDERY HOMEWORKING FAMILIES.

| NATIONALITY. | Number of heads
of families. |
|-----------------|---------------------------------|
| Italian | 56 |
| American | 23 |
| German | 8 |
| Irish | 2 |
| Norwegian | 2 |
| English | 1 |
| Hungarian | 1 |
| Russian | 1 |
| Swiss | 1 |
| Total | 95 |

It will be seen from this table that outworking is divided chiefly between Americans and Italians. The work of cutting out does not require any extraordinary skill or strength. It has been found in other homework, notably the study made for the Factory Investigating Commission, that in all homework in New York City, the lead is taken by Italians.

HOMEWORK ON EMBROIDERY AN OUTLAW INDUSTRY

Section 100 of the labor law, which prohibited the use of a room or apartment in a tenement house for the manufacturing of certain articles, did not prohibit work on embroidery without a license. So that the homes in which this work is carried on are entirely outside legal protection. The law which sought to prohibit the premature employment of young children in industry is repeatedly broken down. In fact, the child worker in any home trade is perhaps in a more precarious position than the factory child toiler. The sanitation of the factory in which children are employed is subject to the rigid scrutiny of state inspectors; the number of hours during which a child may work in a factory or mercantile establishment is limited; night work is prohibited, and the child generally is the ward of the law's generous care. The opposite of all this, unfortunately, is true of the homeworking child. A child may work and usually does during all hours; day

and night; the sanitary condition of the home must suffer when the economic condition of the family is such that it makes it necessary for the home to be invaded by industry; young children are frequently left to care for themselves as best they may, so that the mother may devote more time to the homework at night.

Similarly is the same condition true of the women workers in the homes. It has often been found that manufacturers who will not break the hour law by keeping their women employees beyond the prescribed period in the factory will give their workers goods to take home which may be worked on there, without incurring the law's penalty.

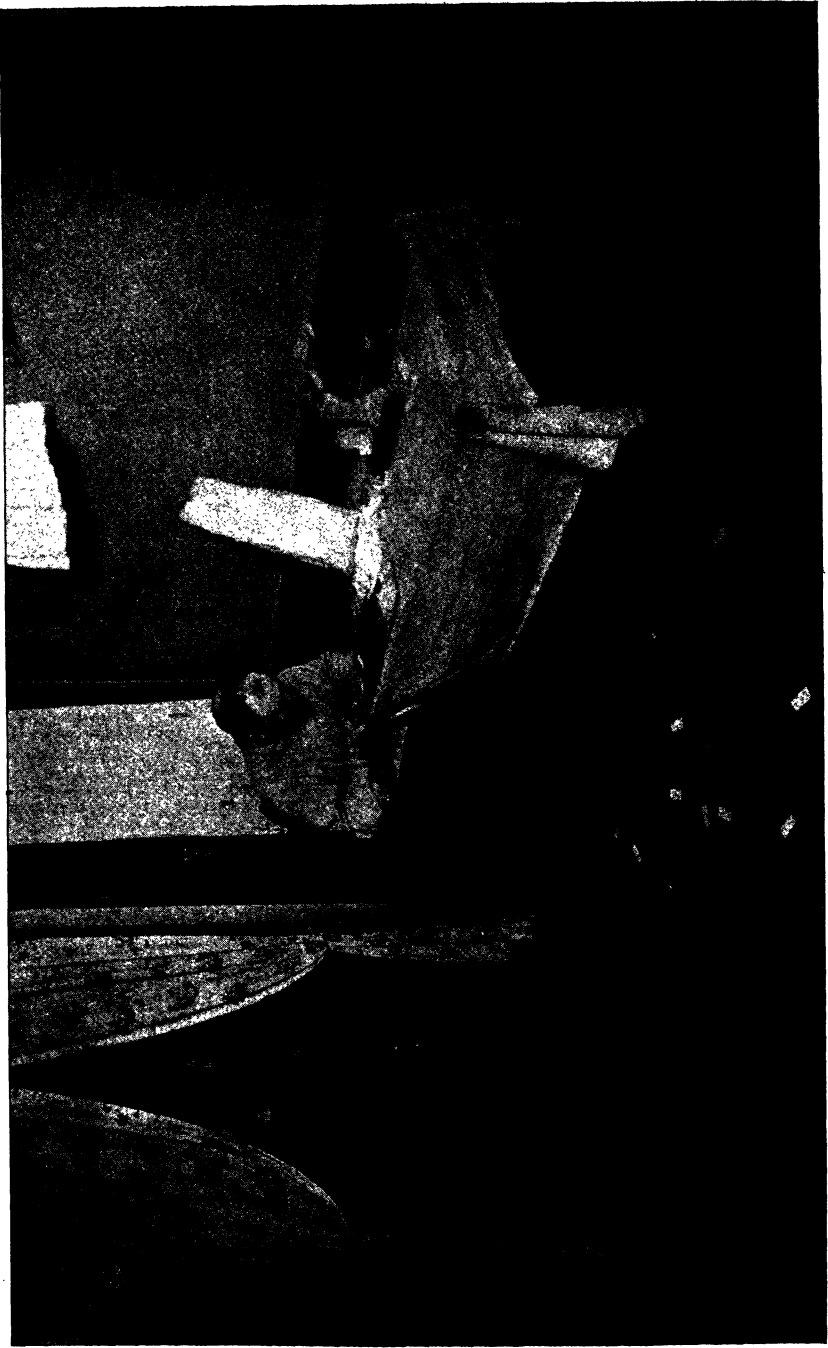
COMPETITION OF THE HOME AND FACTORY WORKER

Owing to the economic condition of the homes into which work is sent, the wages can be squeezed down to the lowest level. That this is done will be seen by this report. Where the manufacturer finds that he is enabled to get his work finished in the home for a price less than he would have to pay if the work were done in the factory, he most frequently prefers to have it done where it would cost him the least. So that the factory worker must either be satisfied with the low standard which has been set up by the homemaker or else seek other work.

THE UNFAIR COMPETITION OF THE MANUFACTURER RESORTING TO HOMEWORK

The system of homework brings the cost of production of an article down to the very lowest level at the expense of the health of women and the education of children. The manufacturer who sends his work to be finished in the homes, saves, among other things, the rental of a factory, light, heat, power, implements of manufacture, insurance and liability from injury to employees. All this extra burden is cast upon the person least able to bear it — the worker in the home.

So the manufacturer who is willing to refuse to send work to be done in the home because it is emphatically wrong, is paying more for production than his less scrupulous business brother. He is, therefore, placed at a decided disadvantage in the market in that



Making cigarette cases. Receptacle in which paste is kept is very dirty. Workroom which serves as kitchen and bedroom is dirty.



his product sells for a higher price than the home-made article. The law does not encourage the manufacturer who is trying to add to the sum of human happiness by employing people in large, well-lighted and ventilated factories.

Table No. 2 shows the total number of those found actually at work on embroidery in the 95 families specified. It is significant to note that 5 of the male adults were men 16 years and over. There was a total of 104 adults, including males and females from 16 years of age up. The largest single number of women were between the ages of 25 and 45 years — in the prime of life. This fact taken in connection with the table showing the number of years at homework will show that the majority of workers have been engaged in home industry for a long time. Thus it is seen that the women have their health undermined at the crucial period of life. Most of these homeworking women are married.

TABLE NO. 2.

SHOWING TOTAL NUMBER OF HOMEWORKERS IN 95 SPECIFIED FAMILIES.

| Total. | ADULTS. | | | Child-
ren. | Men
16
and
over. | WOMEN. | | | | CHILDREN. | | |
|--------|---------|------|-------------|----------------|---------------------------|--------|--------|--------------------|----------------|-------------|-------|------------|
| | Total. | Men. | Wo-
men. | | | 16-25. | 25-45. | 45
and
over. | Not
stated. | Under
7. | 7-14. | 14-
16. |
| 152 | 104 | 5 | 99 | 48 | 5 | 20 | 47 | 25 | 7 | 4 | 27 | 17 |

The table shows a decided falling off of women doing homework over 45 years. Where do these women go? Is it a fair assumption that with their vitality sapped, and the burdens of life bearing on them they have fallen under the weight entirely? What may we expect of these mothers after we permit their bodies to be wasted in the drudgery of monotonous toil; their minds stunted by unceasing exhaustion, and their health undermined by insufficient and ill-nourishing foods?

CHILD LABOR IN THE HOMEWORK EMBROIDERY INDUSTRY

The limited study of homework made by the New York Factory Investigating Commission disclosed the fact that the largest single number of child workers in one industry was in the cutting out of

machine-made embroidery. In the present inquiry 48 children were found at work. Their ages range from 4 to 16 years.

TABLE NO. 3

SHOWING ACTUAL NUMBER OF CHILDREN OF THE SPECIFIED AGES FOUND AT WORK IN THE HOMES.

| Under 7. | 7-14. | 14-16. |
|----------|-------|--------|
| 4 | 27 | 17 |

The largest number of any single age group is that for the years 7 to 14. It is obvious from this that homework makes its most serious inroad on the children of school age.

HOMEWORKING CHILDREN IRREGULAR AT SCHOOL

Abundant testimony from school authorities tends to show very definitely that homework by children of compulsory school age is a serious impediment to their progress in school. Irregular attendance due to the necessity of finishing homework at the manufacturer's pressing demands; tardiness due to fatigue; retardation in studies due to inability to keep up with the class, because of irregular attendance, and exhaustion. Not only does the effect of homework fall on the individual pupil's proficiency as a scholar, but it tends to disorganize the school system entirely, making it necessary for the teacher to spend time in bringing the backward pupil up to the rest of the class — the time that might be spent in having the pupils go so much further ahead.

The stories teachers tell of these youngsters falling asleep at their desks are pathetic in the extreme. The burden of carrying on the labor of homework and school duties makes it impossible to perform either task with any degree of efficiency.

In one instance it took a child 2 years to go through one class owing to the burden of homework.

A sidelight on the effect of homework is apparent in the case of the C—— family. Ann, one of the daughters of this family, went through three years in high school, and one month in the fourth year. Then her health gave out, and the doctor said she would have to give up. Nina graduated from public school in

June, 1911. She received a silver medal in class 6B and a gold medal for standing highest at the time of her graduation. Her health, however, had given out, and through strain she had been compelled to remain at home ever since. For children who have made such good school records, it is hardly fair to them or to society that their scholastic careers be cut off so short because of the double strain of school and homework.

TABLE NO. 4.

SHOWING CHILDREN WHO DO NOT WORK IN FAMILIES OF EMBROIDERY WORKERS.

| TOTAL. | Under 7. | 7-14. | 14-16. | Not stated. |
|----------|----------|-------|--------|-------------|
| 126..... | 44 | 60 | 20 | 2 |

CHILDREN WHO DO NOT WORK AT HOME SERIOUSLY
AFFECTED BY HOMEWORK

The 126 children, ranging from babes in arms up to 16 years, all come within the deleterious influences of manufacturing in tenement homes. Some of the children work occasionally, while they are all potential homeworkers. While the actual exhaustion of work does not affect them, the neglect of these children, occasioned by the necessity of the parent's attention to homework, tells largely on their physical welfare. They are often left to care for themselves best they may. When, however, the needs of the child take the mother from her work during the day, she is often to be found late at night, working while the children sleep, in order to make up the time lost by the necessity of attending to her offspring.

The food prepared by the mother, who must divide her attention between homework and home duties, must be of a character susceptible of quick preparation. The food is seldom well cooked or well prepared, while the quality frequently is the very poorest.

An American mother of 35 bewailed her condition to the investigator, saying, "I am very unhappy because I cannot take the children out. I am always tired and nervous. House going to the dogs."

HOMEWORKERS WHO TOIL AT NIGHT

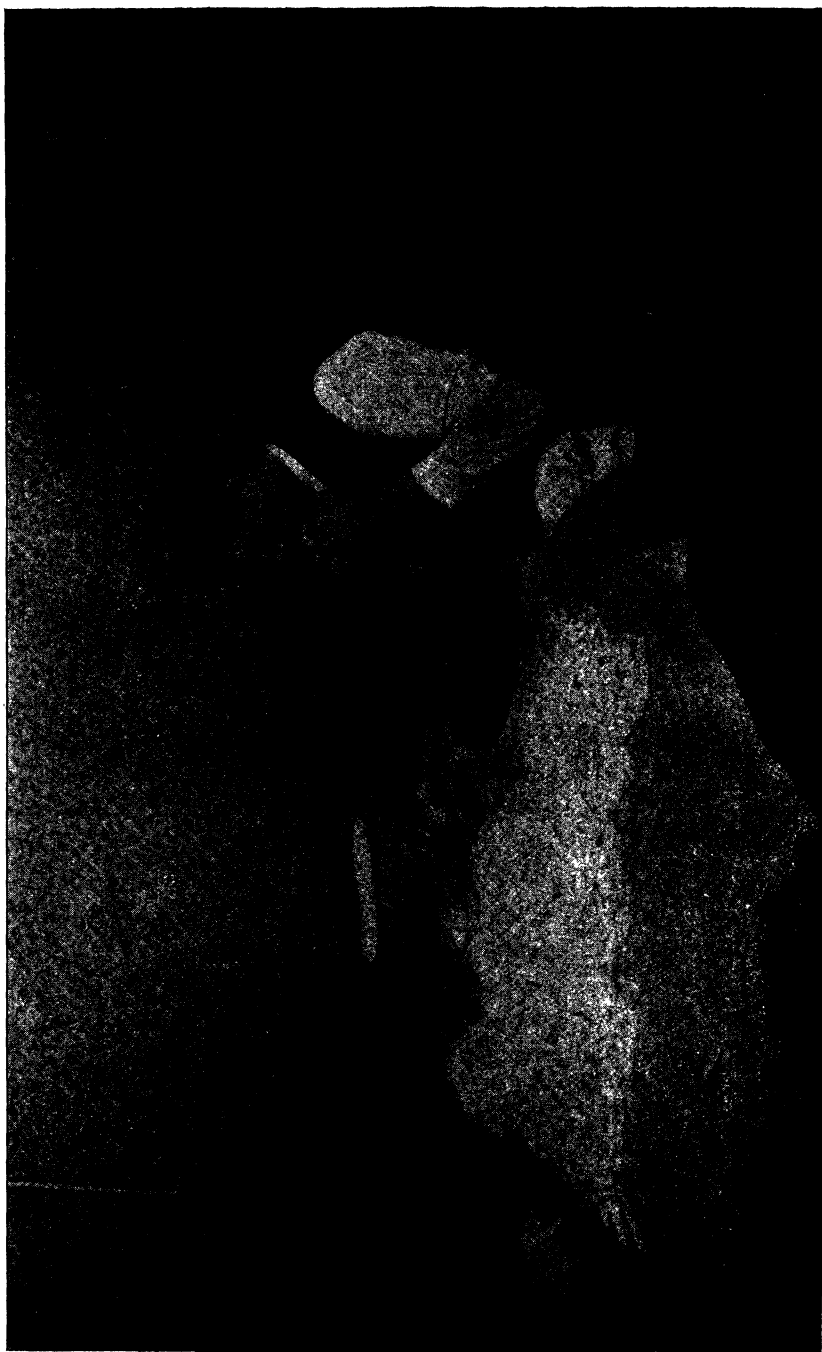
TABLE NO. 5.

SHOWING FAMILIES WHO WORK AT NIGHT ON EMBROIDERY.

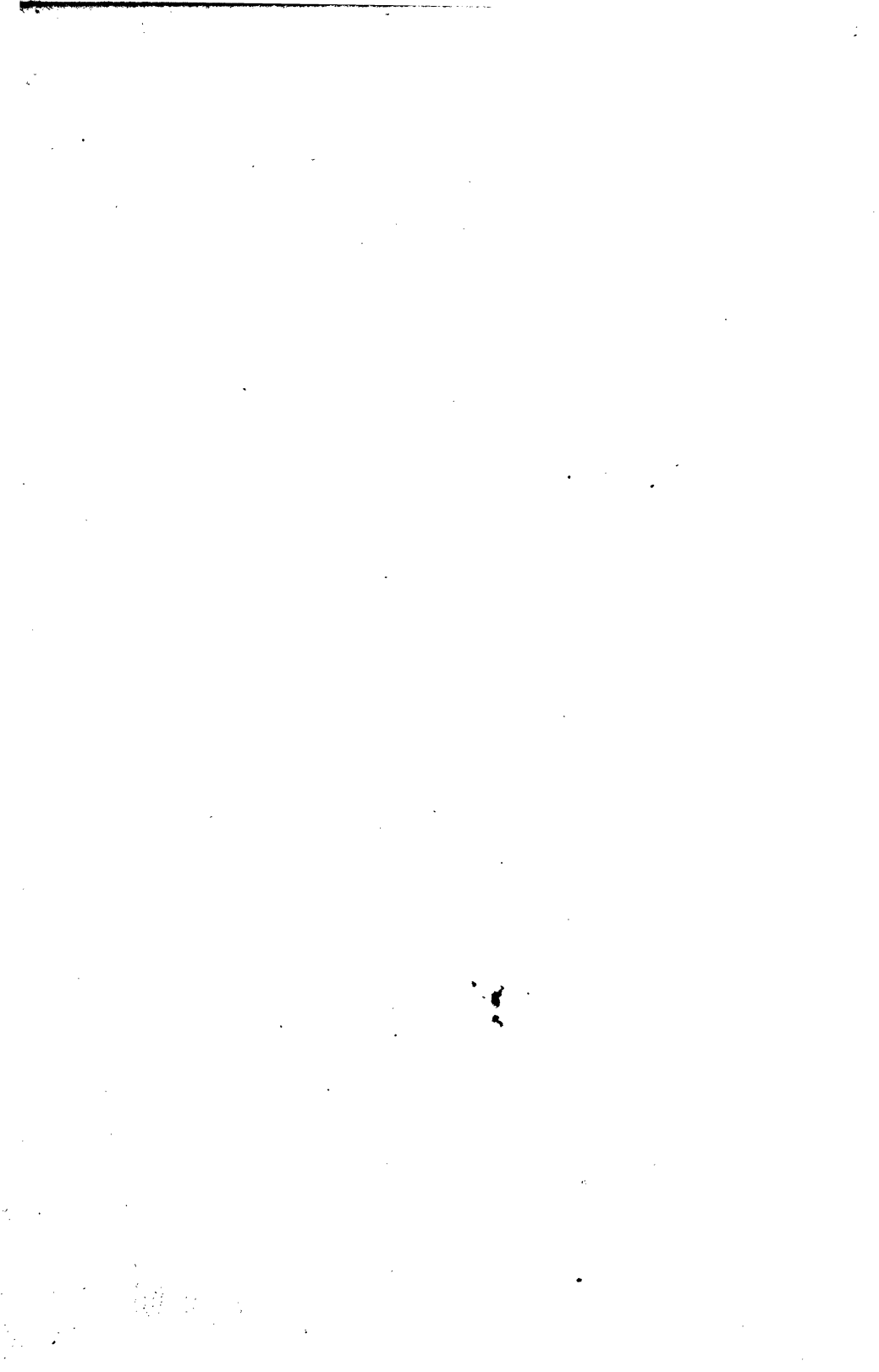
| TOTAL NUMBER OF FAMILIES. | Yes. | No. | Not stated. |
|---------------------------|------|-----|-------------|
| 95..... | 69 | 25 | 1 |

The hours of night work vary, often depending upon the pressure of the manufacturer or upon the economic pressure on the family. The effect, however, whether from one cause or the other, is the same.

The desire for night work is particularly apparent in the families where there are many children. This is due to the fact that the mother can frequently turn out more work when unhampered by the care of little children, who are too young to work. The R—— family is a case in point. There are 9 members of this household, ranging in age from 2 years up to a grandfather 82 years of age. The mother testified that frequently she works from 6 or 7 o'clock at night to midnight. A picture of this particular family is worth outlining here. The father is 35 years old, the mother is 30, both having been born in Italy, but in this country 20 and 27 years, respectively. The father earns from \$5 to \$6 a week when working. None of the children contribute to the family support, except the meagre sums they can earn cutting out embroidery. There is an 82-year-old grandfather in this home, who is partially paralyzed, who, according to the field notes of the investigator, "sits groaning in kitchen. Terrible situation. May die any time." The apartment is dark. The work is done in a dirty kitchen. The family works frequently from 6 A. M. to 10 or 12 midnight. Angelo, the 10-year-old son, works at cutting out as well as John, who is 9. George, 8 years old, cannot work because his eyes are bad, and cutting out requires a steady hand and a watchful eye. Fannie, a daughter of 5, also works at cutting out. The mother said of Fannie, who is 5 years old, "She can work all day. Make 5 cents." In passing, it might be remarked that Fannie is too young to be compelled to go to school, as our compulsory education law affects children



Home worker. High class cigarette cases being pasted by mouth.



between 7 and 16 years of age only. Yet Fannie is not too young to work in the home. The father in this family used to work in the Highway Department, and earned \$2.25 a day. Since two years ago he has had no steady work. From December 9th, 1911, to December 16th, 1911, this family earned \$1.16 cutting out. The family is paid from 15 to 20 cents for scalloping 100 yards of embroidery. This is earned in the case where the work is given out, not by embroidery manufacturers, but by a contractor, who receives the entire output of a factory and farms it out to the families, taking his rake-off for doing nothing but handling the material.

The Ry—— family stated that they worked sometimes up to midnight and 2 A. M. also. There is a 15-year-old daughter in this home who works at cutting out. For 18 weeks' consecutive work, the 2 members of this family earned \$15.65, or an average weekly income of 86 cents or 14 cents average daily income.

The S—— family works mostly at night from 9 to 10 and 11 o'clock.

YEARS AT HOMEWORK

The following table shows for the 95 families specified the length of time they have been engaged in homework. The largest single number have taken work into the home from 2 to 5 years, while the 5 to 10-year period follows directly behind with 31 families, or one less than the 2 to 5-year period. The absence of reward for faithful work is singularly notable in the system of homework. At the end of 1 or 15 years the family is in the same relation to the employer as in the beginning. The low wages are stationary. If one or more drop from the homework pay-roll, they can easily be supplanted from a large number who are seeking some method of supplementing their inadequate income.

TABLE NO. 6.

SHOWING NUMBER OF YEARS FAMILY HAS BEEN AT HOMEWORK.

| TOTAL NUMBER
OF FAMILIES. | YEARS. | | | | | Not stated. |
|------------------------------|-----------------|------|------|-------|-----------------|-------------|
| | Less than
1. | 1-2. | 2-5. | 5-10. | 10 and
over. | |
| 95..... | 7 | 15 | 32 | 31 | 4 | 6 |

THE PROGRESS OF HOMEWORKING IMMIGRANTS IN AMERICA

TABLE NO. 7.

SHOWING YEARS IN UNITED STATES OF HEAD OF FAMILY IN WHICH HOME-
WORK IS CARRIED ON.

| YEARS. | Number of heads
of families. |
|----------------------|---------------------------------|
| Under 5..... | 2 |
| 5 and under 10..... | 9 |
| 10 and under 15..... | 18 |
| 15 and under 20..... | 16 |
| 20 or longer..... | 26 |
| Native..... | 23 |
| Not stated..... | 1 |
| Total..... | 95 |

One fact stands out in this table, and that is that once subjected to the necessity of homework, seldom does the family escape from under it.

EXPLOITATION OF HOMEWORKERS.

It has been found that a system of sub-contracting exists in the trade, whereby a person would secure the entire output of a factory agreeing to have the same cut for a specific sum. This contractor, in turn, farms out the work to many families, paying them a sum, in some cases, as low as 10 cents for cutting out 100 yards. This is less than half of the usual rate paid by the manufacturer, who sends work into the home directly. The contractor, for the mere handling of the supply, makes frequently half as much as the worker secures for doing the work. These irresponsible sub-contractors further lessen the burden of the factory by obviating the necessity of having the families come to the factories for the work and take it home; bookkeeping and the cost of persons to supervise the sending out of work to the homes. Often these contractors are squeezing the already squeezed sweat-shop wage still lower, oppressing the unfortunate homeworker almost beyond belief.

This system of sub-contracting is only made possible through the ignorance of the families, who are not aware that they can go to the factories and get better prices for their work without the petty tyranny of these self-constituted bosses. The contractor

usually picks out the recent immigrants who, unaccustomed to our ways, are easily inveigled into the scheme. Just as soon as the homeworking family finds that it can get the work from the factory direct, the contractor must scurry about to find new families.

There is cause for alarm in this system because it spreads homework into an area larger than it would ordinarily spread in under normal conditions. Were it not for this system of petty oppression, homework would be confined only to the area measured by the necessities of the factories.

WAGE STANDARDS IN THE EMBROIDERY INDUSTRY

An intensive study of the earnings of 47 homeworking families was made. The sums earned by each family group were secured from the payrolls of two of the large embroidery firms sending work into the homes. The following table for 47 homeworking families will show:

750 APPENDIX IV — MANUFACTURING IN TENEMENTS.

- (1) The number of weeks' work.
- (2) Number of persons in the family group.
- (3) Whether or not other homework is done by specified family.
- (4) Number of workers on embroidery in group.
- (5) Whether night work is done.
- (6) Total amount earned during specified period.
- (7) Weekly average earnings for family group.
- (8) Daily average earnings for group.

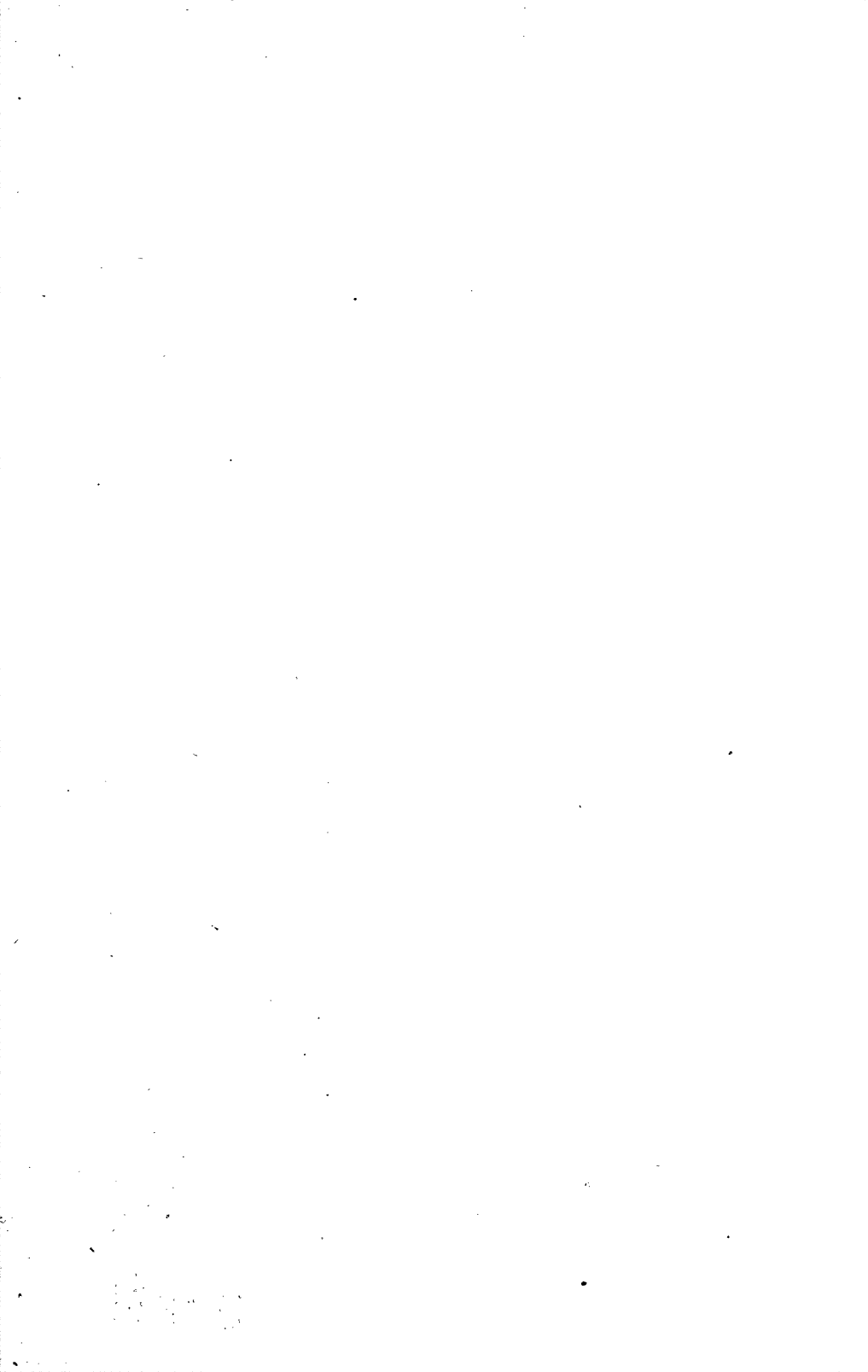
TABLE No. 8.

SHOWING WAGES EARNED BY FAMILIES IN THE EMBROIDERY TRADE.

| Total number of weeks' work. | Number of persons in family. | Other homework. | Number of home-workers. | Night work. | Total amount earned during specified period. | Weekly average earnings for family group. | Daily average earnings for family group. |
|------------------------------|------------------------------|-----------------|-------------------------|-------------|--|---|--|
| 1 | 6 | No | 1 | No | \$0 51 | \$0 51 | \$0 08 |
| 1 | 1 | No | 1 | Yes | 2 48 | 2 48 | 41 |
| 2 | 7 | No | 3 | Yes | 1 41 | 70 | 12 |
| 2 | 9 | Yes | 4 | Yes | 1 77 | 88 | 15 |
| 4 | 6 | Yes | 2 | Yes | 7 44 | 1 86 | 31 |
| 5 | 3 | Yes | 1 | Yes | 13 46 | 2 69 | 45 |
| 8 | 4 | No | 1 | Yes | 7 37 | 92 | 15 |
| 14 | 2 | No | 1 | Yes | 11 27 | 80 | 13 |
| 17 | 3 | No | 1 | No | 15 01 | 88 | 15 |
| 18 | 2 | No | 2 | Yes | 15 65 | 87 | 14 |
| 23 | 6 | Yes | 3 | Yes | 41 97 | 1 82 | 30 |
| 24 | 3 | No | 1 | Yes | 19 02 | 79 | 13 |
| 24 | 4 | No | 1 | Yes | 41 21 | 1 72 | 29 |
| 24 | 3 | No | 1 | Yes | 29 48 | 1 23 | 20 |
| 24 | 6 | No | 1 | Yes | 32 96 | 1 37 | 23 |
| 24 | 2 | No | 1 | Yes | 16 71 | 70 | 12 |
| 24 | 3 | No | 2 | No | 11 66 | 48 | 8 |
| 24 | 2 | No | 1 | Yes | 58 81 | 2 45 | 41 |
| 24 | 4 | Yes | 1 | Yes | 43 34 | 1 80 | 30 |
| 24 | 7 | No | 3 | Yes | 20 11 | 84 | 14 |
| 24 | 6 | No | 1 | No | 44 30 | 1 84 | 31 |
| 24 | 3 | No | 1 | N. S. | 20 27 | 84 | 14 |
| 24 | 1 | No | 1 | Yes | 26 76 | 1 11 | 18 |
| 24 | 3 | No | 1 | Yes | 29 65 | 1 23 | 20 |
| 24 | 4 | No | 1 | No | 22 55 | 94 | 16 |
| 24 | 2 | No | 2 | Yes | 71 98 | 3 06 | 50 |
| 24 | 7 | No | 1 | Yes | 20 59 | 86 | 14 |
| 33 | 7 | No | 3 | Yes | 100 19 | 3 04 | 61 |
| 37 | 7 | Yes | 2 | Yes | 55 88 | 1 51 | 25 |
| 38 | 3 | No | 1 | Yes | 71 49 | 1 88 | 31 |
| 40 | 2 | No | 1 | Yes | 81 77 | 2 04 | 34 |
| 40 | 5 | No | 1 | Yes | 136 30 | 3 41 | 84 |
| 42 | 4 | No | 1 | Yes | 171 50 | 4 08 | 57 |
| 42 | 8 | No | 1 | No | 64 07 | 1 52 | 8 |
| 45 | 5 | No | 2 | Yes | 108 60 | 2 41 | 25 |
| 46 | 8 | Yes | 4 | Yes | 99 57 | 2 16 | 40 |
| 47 | 5 | Yes | 1 | Yes | 83 61 | 1 78 | 36 |
| 47 | 6 | No | 2 | No | 89 37 | 1 90 | 30 |
| 47 | 4 | No | 1 | Yes | 80 67 | 1 72 | 32 |
| 49 | 8 | No | 2 | Yes | 141 49 | 2 89 | 29 |
| 50 | 5 | No | 1 | Yes | 9 83 | 1 84 | 48 |
| 51 | 9 | No | 4 | Yes | 106 08 | 2 08 | 31 |
| 51 | 1 | No | 1 | Yes | 141 19 | 2 77 | 36 |
| 52 | 1 | No | 1 | Yes | 177 29 | 3 41 | 46 |
| 52 | 4 | No | 1 | Yes | 109 65 | 2 11 | 57 |
| 55 | 2 | Yes | 1 | Yes | 217 52 | 3 95 | 35 |
| 65 | 3 | No | 3 | Yes | 249 29 | 4 53 | 66 |
| | | | | | | | 75 |



Mr. C.—making cigarette cases at home in the evening.



A typical picture of the homeworking family with its self-perpetuating poverty system follows:

The B—— family lives on the third floor of a towering tenement in a congested Harlem district. The family receives from a large firm embroidery to cut out, for which the family is paid at the rate of 25 cents for scalloping 100 yards. When the embroidery season is slack, the family takes to the making of laces and booties. There are 8 in the family; a father 40 years of age and a mother 41 years, both born in Italy, and in the United States 9 and 8 years, respectively. The father is a cornet-player, paid by the engagement, his maximum fee being \$5. His work is very irregular. This family of 8 lives in three rooms, for which they pay \$11.50 a month rent. For 5 or 6 years the family has taken in embroidery. The mother is sick with rheumatism. At the time of the inspector's visit the mother was suffering from a toothache, and had a very dirty rag tied around her head. The little children were very dirty, but the older girls fairly clean and neat. Besides embroidery, the family frequently also works for the same firm on handkerchiefs, receiving 3½ cents for work on a dozen. It takes about one hour to do a dozen. The work on booties has been discontinued, as the man who gave the work still owes the family \$3 or \$4 for work done and not paid for. When a handkerchief is lost, the family must pay for it.

For 46 consecutive weeks of work, this family, 4 of whom worked, earned a total of \$99.57, or a weekly average for the group of \$2.16. This is equivalent to 36 cents a day for the work of 4 members of the family, or a weekly average of 54 cents for each member of the family, or 9 cents daily for the individual for the period specified.

It was stated that the family worked approximately 4 to 6 hours a day. There are three daughters in this group, 14, 12 and 9 years of age respectively, and an 8-year-old son, all of whom work at cutting out. Sometimes the work extends to 8 or 9 o'clock at night.

THE ACCURACY OF THE STATED EARNINGS

Each of the 47 families investigated was asked to estimate its average weekly earnings. When these estimates were reported they were compared with the actual average weekly earnings, taken from the factory payroll. In every case, the family estimate was higher considerably than the actual average weekly earnings as shown on the books.

The following table shows:

- (1) Family estimate of usual daily earnings.
- (2) Actual average earnings per day, taken from factory payroll.
- (3) Family estimate of usual weekly earnings.
- (4) Actual average weekly earnings.

TABLE No. 9.

| Family estimate of usual daily earnings. | Actual average earnings per day from payroll. | Family estimate of usual weekly earnings. | Actual average earnings per week from payroll. |
|--|---|---|--|
| \$0 15 | \$0 15 | \$0 65 | \$0 88 |
| 20 | 14 | 2 50 | 84 |
| 22½ | 14 | 1 50 | 87 |
| 30 | 30 | 1 75 | 1 78 |
| 32½ | 41 | 2 00 | 2 48 |
| 35 | 31 | 1 50 | 1 84 |
| 37½ | 29 | 2 75 | 1 72 |
| 40 | 13 | 2 25 | 79 |
| 40 | 12 | N. S. | 70 |
| 40 | 14 | 3 00 | 84 |
| 40 | 45 | 2 75 | 2 69 |
| 45 | 20 | 3 00 max. | 1 23 |
| 45 | 14 | 2 50 | 88 |
| 50 max. | 46 | 1 75 | 2 77 |
| 50 | 40 | 3 00 | 2 41 |
| 50 | 31 | 2 25 | 1 84 |
| 50 | 57 | 3 50 | 3 41 |
| 50 | 18 | 2 00 | 1 11 |
| 50 | 68 | 3 50 | 4 06 |
| 50 | 13 | 2 12½ | 80 |
| 55 | 7 | 2 50 | 3 95 |
| 60 | 24 | 3 00 | 2 04 |
| 60 | 8 | 3 50 | 61 |
| 60 | 15 | 1 25 | 88 |
| 70 | 15 | 3 00 | 92 |
| 75 | 80 | N. S. | 1 82 |
| 75 | 22 | 3 50 | 1 90 |
| 75 | 61 | 2 25 | 3 04 |
| 80 | 23 | 3 00 | 1 37 |
| 80 | 29 | 4 00 max. | 1 72 |
| 85 | 25 | N. S. | 1 52 |
| 90 | 20 | N. S. | 1 23 |
| 1 00 | 36 | N. S. | 2 16 |
| 1 00 | 57 | 3 50 | 3 41 |
| 1 00 | 75 | 4 50 | 4 53 |
| 1 25 | 31 | 3 00 | 1 86 |
| 1 25 | 35 | 3 00 | 2 11 |
| N. S. | 36 | 2 25 | 2 08 |
| N. S. | 48 | 2 25 | 2 89 |
| N. S. | 8 | 75 | 48 |
| N. S. | 41 | 2 00 | 2 45 |
| N. S. | 30 | 3 50 | 1 80 |
| N. S. | 12 | 1 62½ | 70 |
| N. S. | 16 | 1 75 | 94 |
| N. S. | 25 | 1 62½ | 1 51 |
| N. S. | 50 | 5 00 | 3 00 |
| N. S. | 31 | 2 25 | 1 88 |

Out of 95 families specified 81 did no other work than embroidery at home, while 14 families worked at some other home industry besides the cutting out of embroidery. From this it may be fairly assumed that the earnings from embroidery as specified in the tables show the extent to which these families can supplement their incomes.

TABLE NO. 10.

SPECIFYING WHETHER FAMILY ENGAGED IN EMBROIDERY HOMEWORK DOES
OTHER HOMEWORK.

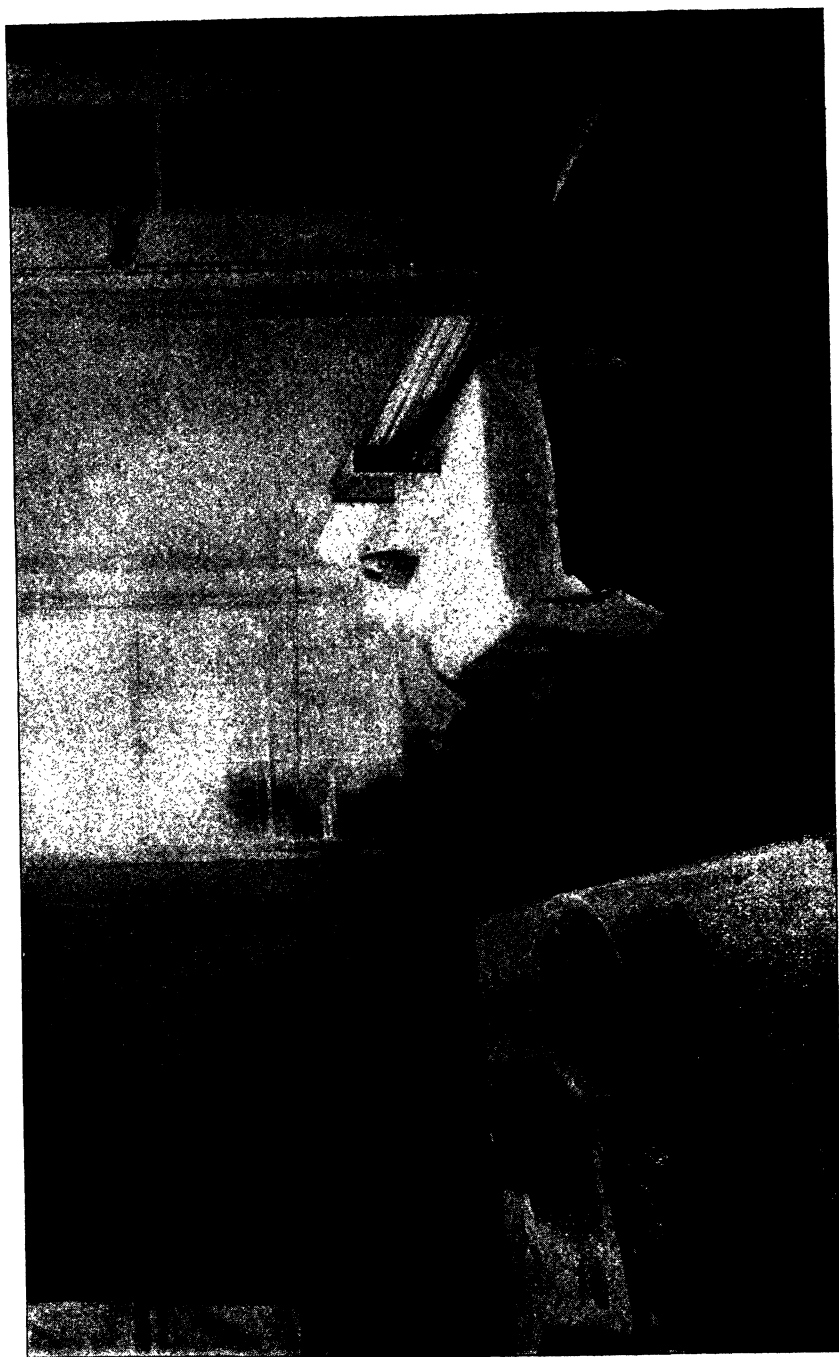
| TOTAL NUMBER OF FAMILIES. | Yes. | No. |
|---------------------------|------|-----|
| 95..... | 14 | 81 |

COST OF IMPLEMENTS, MATERIALS, ETC., NECESSARY IN THE
PROSECUTION OF EMBROIDERY HOMEWORK

It must not be assumed that the sum stated in Table No. 8 as the actual earnings of the family from homework are net. It has been found that in almost every process in which home labor is applied, the implements or materials used in the prosecution of the work make considerable inroads on the gross income from homework. For instance, where scissors are in constant use, as is the case in the embroidery trade, they must be sharpened once or twice a week in order to render good service. This costs 5 or 10 cents a week, and when this is deducted from the meagre earnings, there is little left.

The amount of time consumed in going for and returning with work is also serious from the standpoint that the period utilized in this way must be reckoned in the total number of hours of work. It is true that children are frequently sent to bring work from the factory to the home and carry the completed work from home to factory. In some cases, carfares are spent. The consumption of light in night work must also be taken from the gross income. As was seen by Table No. 5, 73 per cent of the families doing homework worked at night. This, incidentally, adds greatly to the fire risk, as inflammable materials in considerable quantities are left in these already crowded homes.

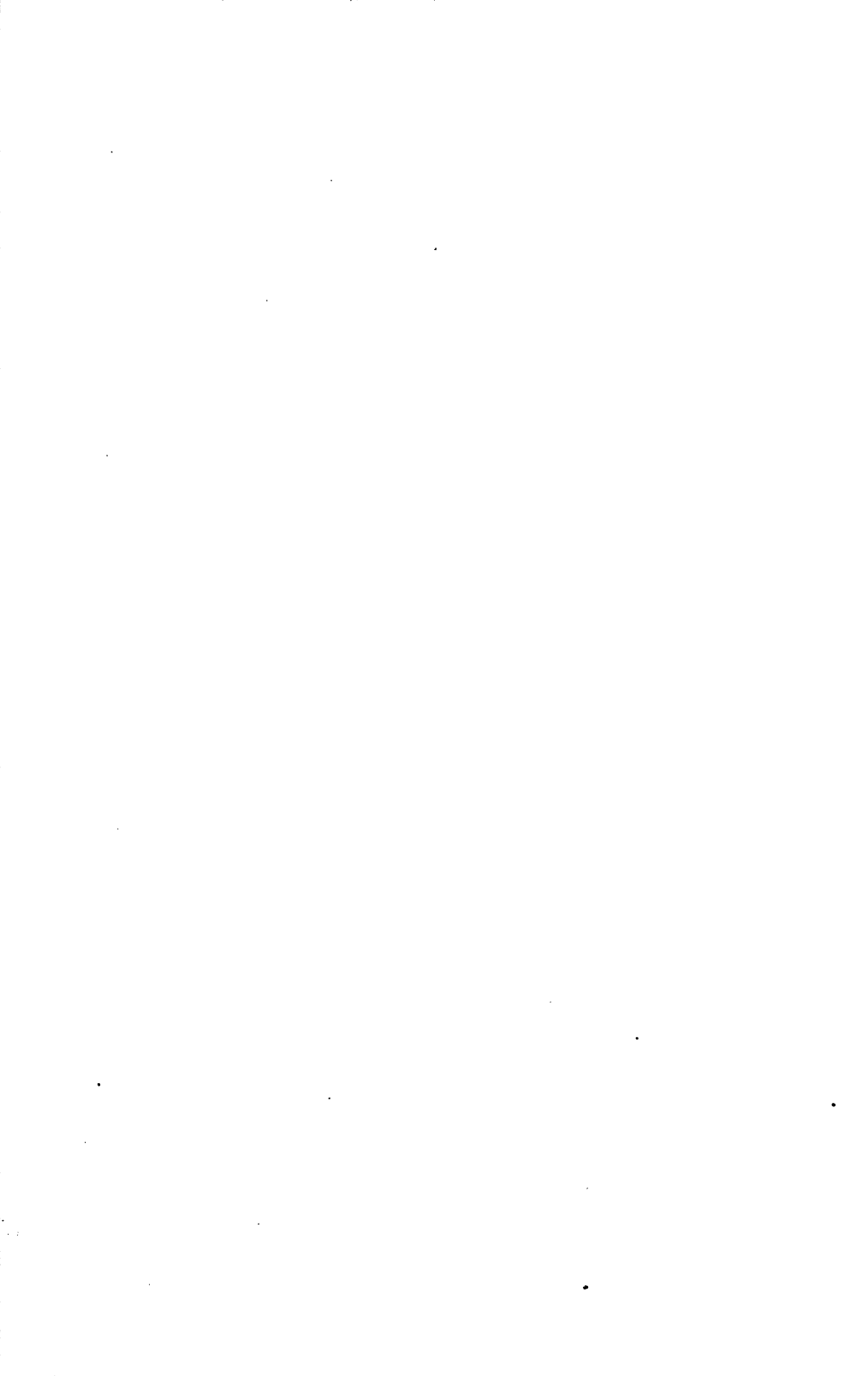
One of the factories with the largest number of homeworkers requires the work to be returned to the factory 24 hours after it is taken out. This frequently means carfare to some families,



Mrs. L.—making cigarette cases. Case of measles in adjoining apartment.

while it always means more time spent in getting and returning work. In one case a homeworker waited from 9 A. M. to 12, noon, for work.

Some factories deduct from the earnings all damage to goods, such as incisions into the embroidery.



APPENDIX V

INDUSTRIAL CONDITIONS IN THE CANNING INDUSTRY OF NEW YORK STATE

REPORT BY ZENAS L. POTTER
OF AN

INVESTIGATION CONDUCTED DURING THE SUMMER OF 1912

BY THE

NEW YORK STATE FACTORY INVESTIGATING COMMISSION

ACKNOWLEDGMENT

I wish to acknowledge the enthusiastic and able work on this
Investigation of

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CHAPTER I

INDUSTRIAL CONDITIONS IN THE CANNING INDUSTRY OF NEW YORK STATE.

THE POINT OF VIEW.

It is the purpose of this report to describe the industrial conditions in the canning industry of New York State and to draw conclusions therefrom.

THE PLAN AND SCOPE OF THE INVESTIGATION.

The facts presented are the result of a thorough investigation made during the canning season of 1912 by a staff of ten investigators who visited practically every canning factory in the State, one hundred twenty-one establishments in all.

Where it was possible to get at the truth by official inspection, that method was employed. Where it was felt that the factory proprietor or his employees were concealing the truth, or where special information was desired, investigators were sent to obtain employment as workers in the factories. Results justified this latter method. Investigators in their instructions were told to report "the truth and nothing but the truth," and advised to favor the factory in any doubtful cases. Considerable information was taken from the official records of the factories. It is believed that the facts herein contained are unassailable as a presentation of the existing industrial conditions of the canning industry in New York State.

PRINCIPLES UPON WHICH CONCLUSIONS OF REPORT ARE BASED.

When it comes to the conclusions drawn from these facts, the personal element enters in, and debatable ground is reached. In order, however, to clear up the cause of any disagreement at the start, it is well that the principles be set forth which, when applied to the facts warrant the conclusions herein reached.

These principles are as follows:

First. That no industry should be carried on at the expense of the vitality of the women and children who are employed in it.

Second. That until the sixteenth year is reached it is of the first importance for a child to develop normally, and any occupa-

tion which interferes with its normal development, physical or mental, is objectionable.

Third. That it is a proper function of the State, through the exercise of its police power, to prohibit any employment of women which saps their vitality and any employment of children which prevents their normal, physical or mental development.

Fourth. That the conditions of labor in factories is a matter of public concern, and that the State through its police power has authority to demand, and should demand, that dangerous machinery be guarded, and that insanitary conditions, especially in factories where food products are handled, be made sanitary.

THE CANNING INDUSTRY IN NEW YORK STATE.

The canning industry in New York State assumed commercial prominence a little more than half a century ago. Since then, its growth has been phenomenal. Besides a few fish canneries, a considerable number of pickle and sauerkraut factories, and numerous fruit drying establishments scattered throughout the State, there were one hundred and twenty-eight canneries engaged primarily in canning fruits and vegetables during the season of 1912. (1) Our investigation deals only with these latter establishments.

The value of the fruits and vegetables packed in these factories approximates \$8,500,000. The total number of cases of each product packed in 1909 is as follows:

TABLE NO. I.
CANNED GOODS PACKED IN NEW YORK STATE FRUIT AND VEGETABLE CANNERIES IN 1909.*

| PRODUCT. | Number of cases packed. | Value of product. |
|---------------------------|-------------------------|-------------------|
| Peas..... | 1,438,059 | \$2,681,366 |
| Beans..... | 569,176 | 1,024,065 |
| Corn..... | 771,475 | 1,197,999 |
| Succotash..... | 68,673 | 174,119 |
| Tomatoes..... | 347,714 | 657,375 |
| Pumpkins..... | 103,127 | 150,974 |
| All other vegetables..... | 157,767 | 386,006 |
| Apples..... | 429,180 | 753,231 |
| Berries..... | 214,134 | 596,130 |
| Cherries..... | 90,445 | 323,803 |
| Peaches..... | 41,727 | 141,142 |
| Pears..... | 51,686 | 216,858 |
| Plums..... | 52,853 | 76,449 |
| All other fruits..... | 20,845 | 74,842 |
| Total..... | 4,356,861 | \$8,454,359 |

(1) For a list of these places, with the fruits and vegetables canned, see Appendix, Table I.

* Compiled from Bulletin of Manufactures, New York State, Thirteenth United States Census.

In its output of canned peas, New York ranks second among the States of the Union; in its output of canned beans, third; and in its output of canned corn, sixth.

It is evident from the foregoing facts that the industry is of considerable importance in and benefit to the State. The manufacturers engaged in it deserve every reasonable consideration from the State. On the other hand, there are employed in these factories, off and on through the season, approximately 14,000 men, women and children, whose health and whose protection from injurious conditions of labor are a vital concern of the State. These likewise deserve every reasonable consideration.

It is our belief that the facts contained in this report will demonstrate that there is nothing about the canning industry which makes it impossible to protect the workers from injurious labor, and at the same time permit the factory owners in this State to operate successfully and to make reasonable profits in competition with men engaged in the industry elsewhere.

CHAPTER II

CHILD LABOR.

Large numbers of children are employed in the canning industry of New York State. They work in the fields, in the factories proper, and in what are known as the cannery "sheds." The Factory Commission investigators in 1912 found one thousand three hundred and fifty-five (1,355) children under sixteen years of age employed in the canning factories proper and in the "sheds" of these factories. One hundred and forty-one (141) were under ten years old, ranging from three years up, and nine hundred and fifty-two (952) were under fourteen years.

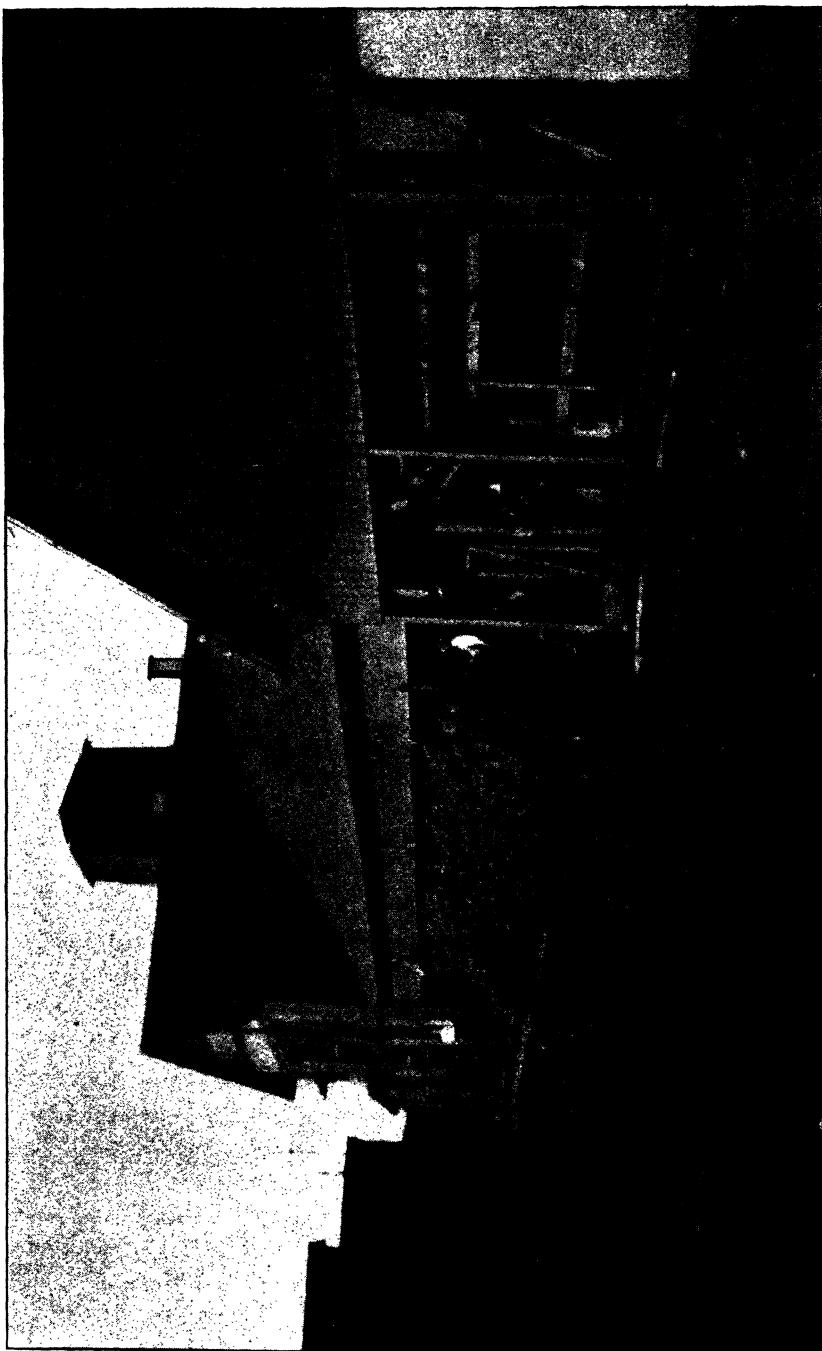
Of the 1,355 children, 96 were employed in the factories proper, and 1,259 in the cannery "sheds." All but 12 of those under fourteen years of age were employed in the "sheds."

A canning factory is usually made up of a group of buildings: in most cases there are at least three — a process building, where the vegetables and fruits are sealed and cooked; a store-house; and a "shed" where the vegetables and fruits are prepared, the beans snipped, corn husked, etc. It is in these "sheds," which will be more fully described later, that most of the children are employed.

HISTORY OF THE SHED QUESTION.

To gain a clear understanding of the child labor situation in the canneries it is necessary to review briefly the historical genesis of the question. In 1896 the State of New York enacted a law prohibiting the employment of children under fourteen years of age in factories. It also prohibited the employment of children under sixteen years of age unless provided with employment certificates. In 1903 representatives of the canning industry had introduced at Albany a bill which failed of passage⁽¹⁾ amending the child labor law so as to permit the employment in canning factories of children under sixteen years during the vacation period, without an employment certificate. At that time there seemed to have been no question in the minds of the canners but that the prohibitions of the labor law covered the cannery "sheds"

(1) Assembly Bill No. 1144.



THE "SHED" IN THIS FACTORY IS LOCATED BETWEEN TWO PARTS OF THE FACTORY BUILDING.

as well as other parts of the establishment. This is evident from a statement made at that time by a representative of the State Canned Goods and Packers' Association, who said before the Labor and Industries Committee of the Assembly: "The amendment is broad enough to allow children under fourteen to work in the factory itself. *I think it would be quite proper if the amendment applied only to the corn husking and bean sheds.*"

In the same year a bill was introduced in the Legislature and enacted into law which broadened the provisions of the child labor law to include work not only in factories but "in connection with" them. The purpose of this enactment was not apparently to apply the law specifically to cannery "sheds."⁽²⁾ At the same time, it was intended, unquestionably, to broaden the general application of the labor law, and would seem to have made more than ever certain what had up to this time been unquestioned — that the labor law controlled the factory "sheds" of the canneries.

In 1905, however, certain canners came to the Honorable P. T. Sherman, then Commissioner of Labor in New York State, requesting him to investigate and determine whether the factory law applied to the "sheds." As a result of this application, the Commissioner sought a ruling on the question from the Attorney-General of the State in the following letter:

September 12, 1905.

"HON JULIUS M. MAYER,
Attorney General,
Albany, N. Y.:

DEAR SIR.—Certain canneries in this State employ children under 14 years of age, and children under 16 years of age without certificates, in sheds adjacent to their factories, under the conditions described below; and I respectfully ask your opinion and advice as to whether such employment be an employment "in or in connection with any factory" within the meaning of those words as used in Section 70 of the Labor Law.

To present the question in a concrete shape, I will fully describe four cases:

No. 1. The factory is situated among the fields where, in season, beans are picked, passed into sheds, where they are strung,

⁽²⁾ See Report of the N. Y. Labor Bureau of Factory Inspection of the N. Y. State Dept. of Labor for the year 1908, pp. 336 et seq.

and thence into the factory, where they are canned, the canning company operating all three. Children, along with many adults, are employed in the sheds during the bean stringing season; that is, in vacation only. The sheds are spacious, clean, and well sheltered and ventilated; the employees are seated comfortably while at work, and proper toilet provisions, etc., are near at hand. The employees are of all ages, and in addition there are a great many infant children too young to work, either in baby carriages or playing around. In short, the sheds are used as sort of public meeting places and playgrounds. They are structurally connected with the factory proper, but are separated by a roadway, and the employees in the sheds are neither required nor permitted to enter the factory. The work is entirely piece work, delivered, weighed and paid for at the factory door; the sheds are within the factory enclosure, which, however, is wide open, and all are free to come and go, and do come and go, at will; and there is no record of time kept of the individual workers. The work is irregular, depending upon the crops; does not often last for a whole day, and rarely continues for more than three or four days a week. There is no machinery in the sheds and no suggestion of factory methods or discipline; on the contrary, there is a general air of freedom, and the industrial conditions approach more nearly in every way to those of agriculture than to those of a factory. The children in this case are employed upon advice of counsel that section 70 does not apply to this work.

No. 2. The conditions there are the same in every respect as in the first case, except that the sheds are not within the factory enclosure, and are separated from the factory by a barrier with openings; but they are structurally connected with the factory. There is machinery in them (a conveyor unused at the time of bean picking, and in no way dangerous), and the fields are farther away.

No. 3. This case is the same as No. 2, except that there is a conveyor in use from the shed to the factory.

No. 4. This case is the same as No. 1, except that the factory enclosure is shut, with a watchman at the gate; and presumptively there is some effort to enforce regular hours.

Pending your advice, I have assumed that where factory conditions exist in such sheds, employment therein is, in effect, in a factory, but that where they are distinct from the factory, not shut within its enclosure, and free from all factory conditions, the work therein is no more in connection with the factory than if it were performed in the unsheltered fields or in neighboring barns.

Can you give me a general rule to guide the department in dealing with such cases, of which there are several hundred, each with slightly varying conditions?

Yours respectfully,
(Signed) P. T. SHERMAN,
Commissioner."

The Attorney-General's response was as follows:

STATE OF NEW YORK,

ATTORNEY-GENERAL'S OFFICE,

ALBANY, *September 22, 1905.*

"HON. P. T. SHERMAN,
Commissioner of Labor,
Capitol, Albany, N. Y.:

MY DEAR SIR.—I am in receipt of your communication under date of September 12th in which you inquire as to the interpretation to be given to Section 70 of the Labor Law: This section provides as follows:

'No child under the age of fourteen years shall be employed, permitted or suffered to work in or in connection with any factory in this State. No child between the ages of 14 and 16 years shall be so employed, permitted or suffered to work unless an employment certificate, issued as provided in this article, shall have been theretofore filed in the office of the employer at the place of employment of such child.'

The certificate provided for in this section is particularly described in section 71 and following sections. Primarily, such certificate must be issued by the Commissioner of Health.

The law particularly specifies the hygienic conditions that must surround factories and mercantile establishments, mines and other

places where workmen, women and children are employed, having in view the health of the operatives therein employed. Specific or varying conditions of employment prevail as to each of these various institutions, all, however, with the view of protecting the employees, and especially women and children therein employed.

This section under discussion and applying especially to children should be read in connection with the Compulsory Education Law, as amended by chapter 606 of the laws of 1903. Section 5 of that act provides as follows:

‘It shall be unlawful for any person, firm or corporation to employ any child under fourteen years of age, in any business or service whatever during any part of the term during which the public schools of the district in which the child resides are in session.’

The limitation of the power to employ a child under fourteen years of age is absolute; therefore, during any portion of the year during which the public schools shall be in session, no child under fourteen years of age can be employed in any business or service whatever.

The next limitation is that contained in the Labor Law that no child under the age of fourteen years shall be employed, permitted or suffered to work in or in connection with any factory of this State.

So far as appears in the Labor Law or elsewhere, a child under twelve years of age may be employed in any service or employment outside of the portion of the year when the public schools in his district shall be in session, unless especially prohibited by these provisions of the Labor Law applying to factory and mercantile establishments, mines or other special lines of industry.

In prohibiting the employment in factories the Legislature doubtless had in mind the necessity of protecting a child against danger to health by reason of confinement in a factory, danger from exposure to machinery, and from conditions generally which would make work of that character detrimental to the welfare of a child under the ages provided by the statute.

It seems to me that it was not the intention of the Legislature that a child might be legally employed in vacation period, on a farm or in the open air, in some proper occupation, and yet could

not be legally employed, under precisely similar conditions, if his employer happened to be a corporation or individual owning and operating a factory.

The words used in the statute: 'in connection with any factory in this State' must be held to mean in such connection as would bring the child under conditions which were dangerous or unhealthy or otherwise detrimental to the child's welfare.

If the employment is in sheds devoid of machinery, in the open air, unconnected with a factory, and not subject to the discipline and hours governing factory employment, I am of the opinion that such employment of children is legal, providing it does not conflict with the provisions of the Compulsory Education Law.

The whole scheme of the law seems to be to give the child opportunity to attend the public school, or to receive instruction in a private school, and to protect the health of the child when employed in the vacation period.

I am, therefore, of the opinion that the words 'in connection with any factory in this State,' do not apply to the conditions specified in your communication.

Yours very truly,

(Signed) JULIUS M. MAYER,
Attorney-General."

This ruling was accepted by Commissioner Sherman as exempting the cannery "sheds" from the law's application, and during his administration no further attempt was made to prevent the employment of children in them.

Upon the request of the Canners' Association, Commissioner Sherman furnished the following interpretation and fuller explanation of the Attorney-General's ruling:

"Keep the sheds distinctly separated from the factory by a substantial barrier. Do not let women and children employed in the sheds enter the factory for any purpose. Do not wall the sheds so as to make of them buildings or rooms. Have *NO* active machinery in them; where conveyors are used, run them *TO* but not *INTO* the sheds in which the children are employed. In short, keep the sheds essentially agricultural and as little like factories as possible. Where for any reason any of the sheds have any material amount of idle machinery in them, box the machinery or keep all children in other sheds.

Send all children out of the sheds at dark. By employing them after dark, or permitting their mothers to keep them in sheds after dark, you introduce a condition that is not agricultural and makes the sheds like factories.

Children in the sheds must be really free to quit working at will. Foremen must never urge them on, nor urge the women in charge of them not to leave when otherwise they would. Nor should these women be allowed to coerce the children to work when they are tired or restless. To prevent that I would set aside a convenient place for children to play or rest, and have an intelligent foreman or forewoman in the sheds to see that all children who appear tired or restless are turned out there temporarily to play or rest. Fix some reasonable age limit, say seven or eight, or better still, nine, and allow no children under that age to work at all.

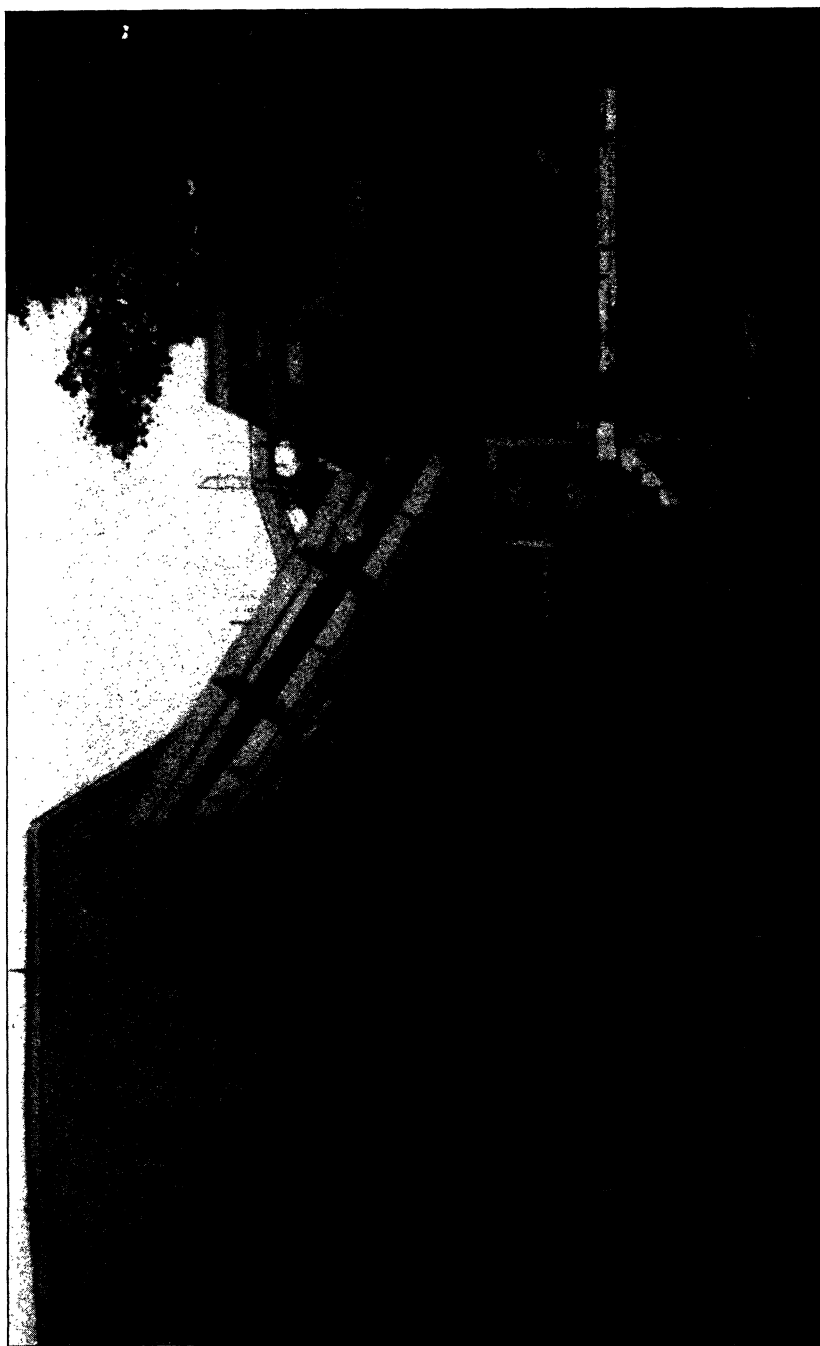
Do not employ children to husk corn or peel tomatoes. (All persons under sixteen are children.)

Where the boxes, in which is placed the material worked on in the sheds, are heavy, such for instance as boxes of husked corn, it would be well to provide men to carry them to the factory door or to the conveyor. In particular, see that the person in charge of the sheds does not allow girls or small boys to carry heavy boxes.

After the beginning of the school season employ no children between seven and sixteen years of age, or who are probably and even possibly between these ages, at any hour; and allow no such children to be found in your sheds, fields or other part of your establishment, whether at work or otherwise, during school hours. One of the most serious charges against you is that by employing children in the sheds you keep them away from school for many months."

As a result of various sharp criticisms of the Attorney-General's ruling, during the summer of 1908, Honorable John Williams who had succeeded Mr. Sherman as Commissioner of Labor instituted nine prosecutions of cannerymen for employing children under fourteen years of age. In four cases the cannerymen pleaded guilty, one case was withdrawn, four were brought to trial. The conditions in these cases were as follows:

Case No. 1. Children were working in the sheds on beans; sheds contained conveyors running into the factory, but not in use



EXAMPLE OF CONVEYOR CONNECTION BETWEEN "SHED" AND FACTORY.



at the time being, used only for peas; shed 15 feet from factory with bare ground between; sides of shed open; at the entrance to the factory from the shed was a temporary fence with a gate set up for the bean season; no regular hours maintained in shed and each one allowed to come and go at will. .

Case No. 2. Children were working in a room of the factory on beans; this room contained bean graders, sorting tables and shafting in use; the portion of the room where the children were at work was separated from the rest by a picket fence three feet high in which was an opening eight feet wide leading into the other part of the room; directly over the fenced-off portion where the children were, was a moving line shaft; usual piece work conditions as to hours.

Case No. 3. Children were working in shed on beans; shed contained machinery for peas and beans, but this was "dead" when the factory inspector saw the children at work; sides of shed open; roof and floor of shed were structurally connected with factory; between factory and shed was a fence with a gate; no regular hours in shed and workers allowed to come and leave when they chose.

Case No. 4. Child was at work in shed on corn; one side of shed contained machinery for peas and corn (conveyor and engine for corn); space containing machinery separated from remainder of shed by a guard rail; sides of shed provided with wooden shutters; usual shed conditions as to irregular hours.(3)

In all four cases the sole reliance of the defense was Attorney-General Mayer's opinion. Obviously the circumstances were not in accordance with the conditions assumed by the Attorney-General as a basis for his opinion, but the local courts were willing to stretch a point, and all four cases were decided in favor of the defendants. Of this result the Commissioner of Labor says:(4)

"These cases make it manifest that not only cannery but local courts, so far from strictly construing the former Attorney-General's opinion, have stretched it to the utmost in the direction

(3) This description taken from the official report of Bureau of Factory Inspection, N. Y. State Dept. of Labor for year 1908, p. 352.

(4) Report of N. Y. Bureau of Factory Inspection in State Dept. of Labor for year 1908, pp. 352-3.

of liberal interpretation. In fact it has become more and more clear throughout this investigation that there has been a pretty general tendency to sweepingly interpret the opinion as legalizing the employment of children under 14 in sheds, without any careful consideration of the very definite conditions laid down in that opinion. Certainly this tendency is so strong that it is the conviction of the Bureau of Factory Inspection, on the basis of its experience in 1908, that it is practically impossible to successfully prosecute for employment of children in any kind of a shed, whether closely conforming to Mr. Mayer's opinion or not."

The Legislature having neglected to clear up the situation, the cannery sheds for all practical purposes have been uncontrolled by the labor laws of the State, and cannerymen have been free to employ children of any age for any number of hours without fear or penalty.

THE SHEDS.

It is of minor importance whether the law thus built up as a result of a former Attorney-General's opinion is or is not in keeping with the facts. The vital question is whether or not abuses have resulted from the fact that the sheds have been for practical purposes uncontrolled by the Labor Law. The Factory Commission is concerned not with what the law has been but with what the law should be. The general construction and equipment of the sheds and their relation to the rest of the factory are of importance in reaching a decision as to what the law should be. For this reason information on these questions was gathered, and in order to present the matter more clearly in its connection with child labor the sheds in which children were employed will be described separately.

Of the 33 sheds reported on where children were employed, 24 were floored and 9 were without floors; 6 were entirely closed by walls, 2 had one side open, 3 two sides open, 9 three sides open, and 13 were entirely open, having only a roof above. The distance from the process building varied from being an extension of it to being two miles away, as the following table indicates:

Distance Between Shed and Process Building:

| | |
|---------------------------------------|----|
| Contiguous with process building..... | 11 |
| 10 feet or less | 2 |
| 11 to 25 feet | 9 |
| 25 to 50 feet | 2 |
| 125 to 300 feet | 4 |
| Half a mile | 4 |
| Two miles | 1 |

In 13 factories there was a barrier to prevent the free passage of persons from the process building to the shed, 5 of these being at a distance of one-half mile or more, which is counted as a barrier. In 20 factories passage between the shed and process building was unobstructed.

As important as any other matter in revealing the opportunity for abuses through child labor is the fact that 24 of the sheds out of 35 contained artificial light for night work.

Fifteen of the sheds had no connection with the rest of the establishment; 4 had structural connection with the process building; 5 had both structural and power connection; 7 connection by power and conveyor; and 6 were connected structurally and by both power and conveyor.

Of the 33 sheds 14 contained machinery and 19 were without machinery. Of those containing machinery, in 6 the machinery was "dead" when the children were employed; in 8 it was active. One shed contained as many as 12 different machines.

Obviously it is impossible to make any generalizations as to whether the sheds closely resemble a factory or not. They vary from a room in a house occupied by Italian workers and situated in the fields half a mile from the factory to a corner of the main factory fenced off by a 2½-foot railing. This much can be said, however, that in most cases the sheds, while open at the sides, are clearly a part of the general manufacturing establishment, being one of a group of buildings that go to make it up.

But the most vital fact is that the great majority of the sheds contain artificial light, by which work may be carried on in many cases long after nightfall has put a stop to agricultural labor.

This artificial illumination permits and has resulted in conditions in the employment of children which otherwise could not obtain, and which draw a sharp line between cannery shed work and agricultural labor.

Forty-seven of the factories inspected have sheds in which no children are employed, either because the companies do not pack beans or corn or because their policy is to employ no children. There is at present no reason, however, why these latter companies may not change their policies and use child labor. Moreover, in many factories women work in both the factories and sheds, no record being kept of their hours of shed work. One factory in the past has pretended to keep the law restricting the hours of women to 60 per week by shifting women from the process building to the shed.

Taking the foregoing conditions into consideration, it would seem of interest to present the facts regarding the physical construction of the sheds at these 47 factories: Forty-five were floored; 2 were without floors; 3 were entirely inclosed; 2 had one side open; 5 two sides open; 10 three sides open; and 26 had all four sides open. Four had a barrier between the process building and the shed to prevent free passage of employees; 43 did not.

The distances between the shed and the process building were:

| | |
|---------------------------------------|----|
| Contiguous with process building..... | 18 |
| 10 feet or less | 2 |
| 11 to 25 feet | 19 |
| 26 to 50 feet | 7 |
| 200 feet | 1 |

Forty-three were provided with artificial light, while but 4 were not. Nine of the sheds were in no way connected with the process building. Three were connected structurally but in no other way, 4 by power but in no other way, 19 by power and conveyor, and 9 structurally and by power and conveyor.

Out of the 47 sheds, 34 contained machinery, while but 13 were without it. Several sheds contained half a dozen or more different kinds of machinery and some contained engines to supply their own power.

The general conclusion to be drawn from a study of the structure and equipment of cannery sheds is that while no broad state-

ment may be made to cover them all, the majority more nearly resemble factories than places in which agricultural labor is carried on. The question of importance, however, is not whether a shed is a field or a factory, but whether there have been child labor abuses in the sheds which need correction.

NUMBER OF CHILD WORKERS.

Because the cannery sheds have been exempt from the law the cannerymen have been free to employ children of any age without restriction. The following table, which gives the ages of children under 16 found at work in the sheds, shows the result.

TABLE NO. II.
SHOWING AGES OF CHILD SHED WORKERS.

| NUMBER OF
SHEDS. | Years.
3. | Years.
4. | Years.
5. | Years.
6. | Years.
7. | Years.
8. | Years.
9. | Years.
10. | Years.
11. | Years.
12. | Years.
13. | Years.
14. | Years.
15. | Total
numbers in
each shed. |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------------------------------|
| 1. | ... | ... | ... | ... | ... | 1 | ... | ... | 3 | 6 | 1 | 4 | ... | 23 |
| 2. | ... | ... | ... | ... | ... | 1 | ... | ... | 5 | 9 | 6 | 5 | ... | 31 |
| 3. | ... | ... | ... | ... | ... | ... | ... | ... | ... | 18 | 10 | ... | ... | 1 |
| 4. | ... | ... | ... | ... | ... | 1 | ... | ... | 17 | 3 | ... | 3 | ... | 62 |
| 5. | ... | ... | ... | ... | ... | ... | ... | ... | 6 | 2 | ... | 5 | ... | 26 |
| 6. | ... | ... | ... | ... | ... | ... | ... | ... | 4 | 2 | ... | 2 | ... | 29 |
| 7. | ... | ... | ... | ... | ... | ... | ... | ... | 6 | ... | ... | ... | ... | 2 |
| 8. | ... | ... | ... | ... | ... | 6 | ... | ... | 1 | ... | ... | ... | ... | 50 |
| 9. | ... | ... | ... | ... | ... | ... | ... | ... | 3 | 5 | ... | ... | ... | 66 |
| 10. | ... | ... | ... | ... | ... | ... | ... | ... | 16 | 10 | 19 | 15 | ... | 11 |
| 11. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 14 |
| 12. | ... | ... | ... | ... | ... | 4 | ... | ... | ... | ... | ... | ... | ... | 11 |
| 13. | ... | ... | ... | ... | ... | 1 | ... | ... | 4 | 1 | ... | ... | ... | 11 |
| 14. | ... | ... | ... | ... | ... | ... | ... | ... | 2 | 2 | ... | ... | ... | 12 |
| 15. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2 |
| 16. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 2 |
| 17. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 18. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 19. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 20. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 21. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 22. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 23. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 24. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 25. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 26. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 27. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 28. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 29. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 30. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 31. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 32. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 33. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 34. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 35. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 36. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 37. | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| Total number clas-
sified as to age... | 1 | 3 | 10 | 16 | 26 | 46 | 39 | 180 | 186 | 239 | 196 | 188 | 129 | 1,259 |



CHILDREN CARRYING BOXES OF SNIPPED BEANS WEIGHING 19 TO
25 POUNDS.



According to this table the children may be classified in the following age groups:

| Ages. | No. of Children. |
|---------------------|------------------|
| 14 to 16 years..... | 317 |
| 10 to 14 years..... | 801 |
| Under 10 years..... | 141 |

These figures do not include all the children who were employed in the sheds for the following reasons:

(1) At several factories which were known to employ considerable numbers of children only a few were found at work when inspection was made.

(2) At four establishments which regularly employed children none were found at work during our inspection.

(3) Two factories in which children worked on corn were not inspected during the corn season.

(4) At one cannery, when the inspector put in an appearance at 5.30 a. m., approximately two hundred children of all ages were hurried away, so that records of their ages could not be made. These children were apparently already working.

(5) At another factory, upon the inspector's appearance, fourteen children ran out at a command from the Italian "boss." All appeared and probably were under 10 years of age. This factory pretended to use no children under that age.

But while a few factories thus hindered the inspectors from gathering facts and were apparently unwilling that the truth be known regarding the conditions in their establishments, the majority readily co-operated in the investigation. Taking into consideration these factories where we were unable to get facts, it is our opinion that if 450 children were added to the number found at work by the inspectors the total of seventeen hundred (1,700) would represent approximately the number who found employment last summer in the cannery sheds of New York State.

WORK OF THE CHILDREN.

The work of the children in the sheds is confined to the snipping of beans and the husking of corn. The work of "snipping" is

simple. At the end of the bean which has been next the vine is a small collar and at the other end is a stringy point. To prepare the beans for canning these must be clipped off. The beans are brittle when snipped and it requires but a quick twist to remove the collar and stringy point. No great muscular effort is required, but after a day of snipping at the beginning of the season it is usual for the wrist to become lame and the fingers quite sore. With children these effects are emphasized.

At certain factories, including those where the largest number of children are employed, the children who snip the beans carry the full boxes to the weigher to be weighed, a distance of sometimes 100 to 200 feet, and occasionally further. At six of these factories investigators stood at the scales for a few minutes and noted the sex and age of each child and the weight of the box carried. The facts gathered are presented in the following table:

TABLE NO. III.
SHOWING WEIGHT OF BOXES CARRIED BY CHILDREN WHO ARE CLASSIFIED ACCORDING TO AGE AND SEX.

| WEIGHT CARRIED. | | GIRLS. | | | | | | | | | | BOYS. | | | | | | | | | | Total number of children classified by weight carried. |
|--|-----|--------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|-----|-----|-----|--|
| | | | | | | | | | | | | | | | | | | | | | | |
| | | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | | | | |
| 3 pounds..... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 4 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3 |
| 5 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3 |
| 6 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3 |
| 7 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5 |
| 8 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3 |
| 9 " | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 17 |
| 10 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 12 |
| 11 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10 |
| 12 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 12 |
| 13 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10 |
| 14 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 12 |
| 15 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 11 |
| 16 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 19 |
| 17 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10 |
| 18 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 11 |
| 19 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 19 |
| 20 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 29 |
| 21 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 25 |
| 22 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 29 |
| 23 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 18 |
| 24 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 11 |
| 25 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 8 |
| 26 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 7 |
| 27 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0 |
| 28 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4 |
| 29 " | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 0 |
| Total number children classified by age..... | 1 | 1 | 1 | 1 | 26 | 19 | 33 | 13 | 33 | 28 | 2 | 2 | 4 | 21 | 15 | 32 | 9 | 17 | 10 | ... | ... | 267 |

It will be seen that the boxes carried by children ranging from seven to fifteen years of age weighed 3 to 29 pounds, the largest number of boxes weighing from 19 to 21 pounds. In England, which has probably the most advanced and scientific factory legislation in the world, children under sixteen years of age are forbidden to carry weights of over 22 pounds. The above table shows that a considerable number of children, some much under sixteen years, carried weights of 22 pounds and over.

Husking corn, an operation known to all, requires more effort than bean snapping. The husks often cling tenaciously to the ear of corn, and it requires all of a small child's strength to tear them away, and to break the stalk from the ear. This occupation when performed for long hours is fatiguing even for an adult.

Corn is husked into crates holding from a bushel to five pecks, and is paid for by the crate, not being weighed. Crates are carried, however, to the checker, usually between two persons, and weigh from 40 to 60 pounds. At certain canneries, mainly small corn canneries, children of all ages, both girls and boys, carry these crates. The strain in these cases is considerably greater than in the carrying of boxes of snapped beans. Small girls have been seen tugging at boxes they were hardly able to carry.

The seats provided for the shed workers must be characterized as poor. The data gathered in the 37 factories employing children in the sheds shows that 28 provided boxes only; two, benches; and one, chairs. Backless boxes, often too high or too low, and ill-adjusted for work, are the seats most commonly provided for snippers and huskers.

The light and ventilation in the sheds are excellent, due to the fact that the sides of the sheds are usually open. The one disadvantage of open air structures is that on cold windy days the workers are exposed. The lighting at night is sometimes very poor, but the work does not require much light, and eye strain is unappreciable.

Fourteen sheds contained machinery which was in operation while the children were at work, with a consequent accident risk. In most cases the machinery consists of a "conveyor," a long belt moved by power, on which boxes and other objects are placed to

CHARTS SHOWING DAYS OF WORK ON BEANS AND CORN

CHART NO. I

DAYS OF WORK ON BEANS AT 6 REPRESENTATIVE FACTORIES

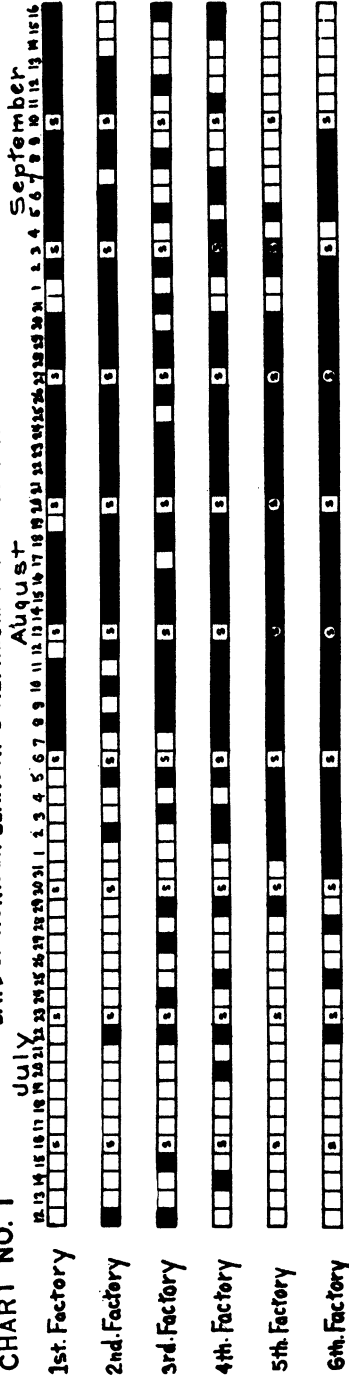
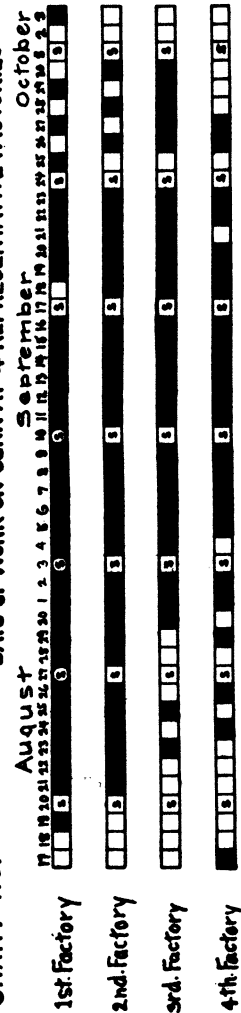


CHART NO. II

DAYS OF WORK ON CORN AT 4 REPRESENTATIVE FACTORIES



EXPLANATION

Each day of the month is represented by a small square. Days when there was work are represented by dark squares. Days of no work are represented by light squares. Sundays are indicated by the letter "S".

be carried from one part of the factory to another. It moves slowly, but contains an element of danger. In 1910 a boy who was not at the time working in the shed was caught and killed in the conveyor at one factory. At another factory the children used to get on the conveyor and ride, till the canner finally fenced off most of its length.

Children are employed most extensively on the bean crop, the duration of which varies from about ten to eighty days, according to the size of the factory, its policy in planting, and the character of the season. In 1911 the duration of the bean crop in forty-one factories in New York State was as follows:

DURATION OF PERIOD OF WORK ON BEANS.

| NUMBER OF FACTORIES. | Number of days from the beginning to end. of bean season. |
|----------------------|---|
| 4 factories..... | 10 to 19 days. |
| 3 factories..... | 20 to 29 days. |
| 10 factories..... | 30 to 39 days. |
| 3 factories..... | 40 to 49 days. |
| 7 factories..... | 50 to 59 days. |
| 5 factories..... | 60 to 69 days. |
| 1 factory..... | 92 days. |

For factories canning only beans, the labor of children is required only at this period. Snipping, however, is not done every day.

Chart No. 1 shows the days on which beans were snipped at six representative factories where children are employed.

It will be seen that at the beginning, and toward the end of the season, the work is quite irregular, but that at each factory there are from twenty-one to forty-two days of very regular work. At one factory there were twenty-four continuous days' work in canning beans, without a Sunday break.

To sum up: The season when children are employed for snipping beans lasts from ten to eighty days, with usually from fourteen to forty-two days of steady work, Sunday work being not exceptional.

The duration of the corn season is not so great. The duration of the corn crop work period in forty canneries in New York State in 1911 was as follows:

DURATION OF PERIOD OF WORK ON CORN.

| NUMBER OF FACTORIES. | Number of days from beginning to end of corn season. |
|----------------------|--|
| 1 factory..... | 10 to 19 days. |
| 4 factories..... | 20 to 29 days. |
| 20 factories..... | 30 to 39 days. |
| 13 factories..... | 40 to 49 days. |
| 1 factory..... | 50 to 59 days. |
| 1 factory..... | 60 to 69 days. |

With the corn, as with the beans, the days of work are irregular at the start and end of the season.

Chart No. II shows the days when corn was husked at four representative canneries where children were employed.

To again sum up, the season when children are employed on corn lasts from ten to seventy days, with usually from fourteen to thirty-five days of steady work:

Twelve factories in the State use children, both for snipping beans and husking corn. In this case, the duration of the period when they work is lengthened. For eight of these factories the length of the period was:

DURATION OF PERIOD OF WORK ON BEANS AND CORN.

| NUMBER OF FACTORIES. | Period of Work. |
|----------------------|-----------------|
| 1st factory..... | 45 days. |
| 2nd factory..... | 51 days. |
| 3rd factory..... | 53 days. |
| 4th factory..... | 61 days. |
| 5th factory..... | 75 days. |
| 6th factory..... | 76 days. |
| 7th factory..... | 85 days. |
| 8th factory..... | 91 days. |

The corn season usually commences before the bean season ends, so that there is no interruption between the two crops. This was the case at the factory where work was done on beans for twenty-four days, without even a Sunday break. Then corn came on and continued the period of work day after day, without a Sunday off, for forty-one days.

To sum up again, for canneries using children on both beans and corn, the duration of the period during which children are

used is from forty to ninety days, with thirty-five to fifty-six days of steady work.

HOURS OF LABOR.

The work of snipping and husking is paid for entirely by the piece, usually a penny a pound for snipping, and three cents a crate for husking. No record is kept of the hours of labor of any worker, and the children, and usually the adults, as far as the canner is concerned, are free to come and go as they please. Consequently, it was impossible by casual inspection on any day to determine the actual hours of labor. Inspectors visited the sheds occasionally only to find that no snipping or husking was being done at the time. They also visited the sheds at 10 o'clock at night and 4.30 o'clock in the morning, and found children at work. At one factory the inspector reported as follows:

"Inspector stayed at factory till 9.30 p. m. Twenty-three children under fourteen years in shed till 9.15 p. m. Some left then, but about a dozen stayed later. When inspector first came, children were carrying boxes of beans weighing 15 to 25 pounds from shed to factory (a distance of about 150 feet) to be weighed. Later, however, a man with a wheelbarrow brought them to the factory. At 9.10 a girl of thirteen and a boy of eleven went to sleep at their work, bent over the boxes they had been snipping into, their heads resting on their arms. Boys told the inspector that boss had said snipping would commence at 4 o'clock next morning. One-half of the shed was covered a foot deep with beans which were held over night."

In order to get first hand information regarding the hours of shed workers, investigators were sent to secure employment as ordinary laborers in the factories. With a limited force it was impossible to secure information at many factories by this method. At one factory an investigator worked from the beginning of the bean season until September 4th. The season was extremely late this year, however, and when she left, beans were still at their height.

The hours of work in the shed during her stay are shown in the following table:

TABLE NO. IV.

HOURS SHED WAS OPEN FOR WORK AT ONE NEW YORK STATE CANNERY.

| DATE. | | Start. | Stop. | Hours. | Minutes. |
|--------|---------|-------------|--------------------------------------|--------|----------|
| August | 2..... | 7.00 A. M. | 11.00 A. M. | 4 | .. |
| " | 9..... | 6.50 A. M. | 11.00 A. M. | 4 | .. |
| " | 13..... | 10.30 A. M. | 5.00 P. M. | 6 | 30 |
| " | 14..... | 9.00 A. M. | 5.30 P. M. | 8 | 30 |
| " | 15..... | 7.00 A. M. | 4.30 P. M. | 9 | 30 |
| " | 19..... | 11.00 A. M. | 6.00 P. M. | 9 | .. |
| " | 20..... | 7.00 A. M. | 6.00 P. M. | 11 | .. |
| " | 21..... | 7.00 A. M. | 6.00 P. M. | 11 | .. |
| " | 22..... | 7.00 A. M. | 2.30 P. M. | 7 | 30 |
| " | 23..... | 7.00 A. M. | 3.00 P. M. | 8 | .. |
| " | 24..... | 6.45 A. M. | 6.00 P. M. | 11 | 15 |
| " | 26..... | 7.00 A. M. | 8.35 P. M. | 13 | 35 |
| " | 27..... | 7.00 A. M. | 9.00 P. M. | 14 | .. |
| " | 28..... | 7.00 A. M. | 8.00 P. M. | 13 | .. |
| " | 29..... | 7.00 A. M. | 7.00 P. M. | 12 | .. |
| " | 30..... | 7.00 A. M. | 6.00 P. M. | 11 | .. |
| " | 31..... | 7.00 A. M. | 5.00 P. M. | 10 | .. |
| Sept. | 2..... | 7.00 A. M. | 6.00 P. M. | 11 | .. |
| " | 3..... | 6.00 A. M. | 6.00 P. M. | 12 | .. |
| " | 4..... | 6.00 A. M. | Did not get
time of clos-
ing. | .. | .. |

Just before the investigator left the factory she reported:

"I was told by one of the women this morning that she was told there were sixty acres of beans which had not been touched, and that this was to be the heaviest week of the season on beans."

No time is taken out for lunch hour in reporting the hours above, because many of the women and children at this factory bring a cold lunch and work right through the noon hour, eating as they work. This is a common practice of snippers and huskers almost everywhere.

The hours, as shown in Table No. IV, are those in which work was actually being carried on in the shed. By no means did all the workers have these hours of labor. At this factory, as most of the children were local and American born, and not in need of the money they earned, not many worked steadily and continuously day after day. However, of the three or four hundred at work, probably a considerable number were regular. The investigator reported that while at night many children worked, there were not so many as in the day time. Children as young as four and five were reported working at night, but they were with their parents. Many children ten and over came alone.

This factory, however, can hardly be taken as typical. Many present a better, many a worse, condition. At some factories



CHILDREN CARRYING BOXES OF SNIPPED BEANS WEIGHING
18 TO 25 POUNDS.

snipping is carried on at night; at others the work goes on in the shed some nights till eleven o'clock, dependent upon the policy of each individual factory. For purposes of discussion, however, it is best to divide the factories employing children into two groups; those which use local American help for snipping and husking, and those which employ foreigners to do the work. In the former, the conditions are usually much better than in the latter.

The Americans need money much less than the foreigners and are much more careful in caring for their children. At the factory referred to above some American mothers would not let their children work at all at night. If the canner makes no attempt to keep the children or the parents of the children at work, as is usually the case, there is little likelihood of overwork or other abuse. The Italian and Polish mothers, however, count every penny, and in some cases they are most cruel in driving their children to work. At factories where foreigners are employed it has been observed that the children do little playing around, but keep steadily at work. Here, instead of being a "public meeting place or playground,"⁽⁵⁾ the shed, whether it is situated in the fields or is a room in the process building, is distinctly a place for work. These foreigners are eager for money and will work day and night if permitted to. The canner, to get his beans snipped, must either bring out from the city a larger number of foreigners, at an increased expense, or work those he has for long hours — consequently the hours of shed work are generally longer in factories where foreigners are employed. It was in one of these factories where the workers were Italians and Poles that 200 children were sent scampering away when an inspector appeared at 5.30 a. m. It was at another factory employing foreign labor that children worked till 9.15 p. m. and were told snipping would begin at four o'clock the next morning.

At one of these factories a "working investigator" kept track of the hours worked by two children, one of whom, a girl eleven years of age, passing as a girl of fourteen,⁽⁶⁾ worked in the factory stacking cans part of the time. The following table shows the hours worked by this girl:

(5) See Commissioner Sherman's letter to Attorney-General Mayer.

(6) Her real age was discovered by inquiries of other children and the local school teacher.

TABLE NO. V.
HOURS OF LABOR OF FLORENCE L. AGED 11.

| DATE. | HOURS OF LABOR. | | | Kind of work. | Total hours |
|---------------|--------------------------|------------|------------|--|-------------|
| | Morning. | Afternoon. | Evening. | | |
| Aug. 13. | | 1.00—6.00 | ..... | Snipping beans and setting up cans. | 5 |
| " 14. .... |  |  | ..... |  |  |
| " 15. | 10.30 no stop for lunch. | till 6.30 | ..... | Snipping beans. | 8 |
| " 16. | 8.00—11.30 | 1.00—6.00 | ..... | Arranging and filling cans | 8½ |
| " 17. | 10.30—12.00 | 1.00—6.00 | ..... | Arranging cans and snipping. | 6½ |
| " 18. .... |  |  | ..... |  |  |
| (Sunday) | | | | | |
| Aug. 19. | No work—rain | | | | |
| " 20. | 8.00—12.30 | 1.00—5.30 | ..... | Snipping and stacking cans. | 10 |
| " 21. | 7.00—12.00 | 1.00—6.00 | 7.00—10.00 | Stacking cans. | 13 |
| " 22. | 7.00—12.00 | 1.00—6.00 | 7.00—9.00 | Stacking cans. | 12 |
| " 23. | | 1.00—6.00 | | Stacking cans. | 5 |
| " 24. | 7.00—11.30 | 1.00—6.00 | 7.00—10.00 | Snipping beans and stacking cans. | 12½ |
| " 25. | 8.00—12.00 | 1.00—3.00 | ..... | Stacking cans. | 6 |
| (Sunday) | | | | | |
| " 26. | 8.00—12.00 | 1.00—6.00 | 7.00—11.30 | Snipping beans and stacking cans. | 13½ |
| " 27. | 8.00—12.00 | 12.30—6.00 | 7.00—11.30 | Snipping and stacking cans. | 13½ |

The other child whose hours of labor were noted was Nellie V—, a little Italian girl of ten years, who worked in the shed snipping beans. Her hours of labor are shown in the following table:

TABLE NO. VI.
HOURS OF LABOR OF NELLIE V. AGED 10.

| DATE. | Hours of labor. | Total hours. |
|---------------|--|--------------|
| Aug. 15. | 11.00 A. M. to 6.45 P. M. (ate one peach only)..... | 7½ |
| " 16. | 9.00 A. M. to 12.00 P. M. | 3 |
| " 17. | 7.30 A. M. to 10.30 A. M. (picking in field). | |
| " 17. | 10.30 A. M. to 3.00 P. M. (snipping) (ate only a little bread and butter)..... | 7½ |
| " 18. | | |
| (Sunday)... | | |
| Aug. 19. | Rain..... | |
| " 20. | 4.30 A. M. to 7.30 A. M. | |
| " 20. | 11.00 A. M. to 12.30 A. M. | |
| " 20. | 1.00 P. M. to 6.00 P. M. | |
| " 20. | 6.30 P. M. to 9.30 P. M. | 12½ |
| " 21. | 4.30 A. M. to 7.00 A. M. | |
| " 21. | 7.30 A. M. to 12.00 M. | |
| " 21. | 12.30 A. M. to 5.00 P. M. | 11½ |
| " 22. | Hours not secured in detail..... | 4 |
| " 23. | 1.00 P. M. to 6.30 P. M. | 5½ |
| " 24. | 11.30 A. M. to 6.00 P. M. | |
| " 24. | 6.30 P. M. to 11.00 P. M. (ate while snipping)..... | 11 |
| " 25. | | |
| (Sunday). | Do not know whether she worked. | |
| Aug. 26. | 4.00 A. M. to 7.30 A. M. | |
| " 26. | 8.00 A. M. to 12.30 P. M. | |
| " 26. | 1.00 P. M. to 6.00 P. M. | |
| " 26. | 6.30 P. M. to 10.00 P. M. | 16½ |
| " 27. | 6.00 A. M. to 10.30 A. M. | |
| " 27. | 11.30 A. M. to 6.00 P. M. | |
| " 27. | 6.30 P. M. to 10.00 P. M. | 14½ |

The following is also a report of an investigator who worked in one of the factories employing Italians:

"Little Jack (aged 12), up from 3 a. m. and snipping from 4.30 a. m. to 10 p. m. with only a few minutes for supper said: 'My fingers is broke.' He went to bed last night at 12 and got up at 3. He said he was 'awful tired,' but his mother made him work. He tried to go home several times. His hands were swollen. His sister (10) could hardly keep her eyes open, and her mother scolded her constantly. Jack made \$1.40 — he said he couldn't keep any of it. He said work like this was nothing to peas when his mother and sister would come home every night at 1 and 2 a. m. and 'they was so sick they fell down and vomited.'"

The next day the investigator reported:

"This morning when I got to the shed at 7, Jack was sitting wrapped up in a big shawl very pale with his black eyes just sagging out of his head. He had his fingers done up in a dirty rag. I asked him if he had to get up at 3 again. He said: 'They pulled me out of bed at 4 o'clock.' His sister cried, but they had to go 'or get a beating.'"

Another little chap (about 11) who had snipped from 4 a. m. to 7 p. m. yesterday, perched all day long, and who snipped to-day from 6.30 a. m. to 10 p. m., told me he thought it was 'only 8 o'clock at night, when they dragged him out this morning at 4. 'He thought he had been asleep only a minute.'"

Where American help is used for snipping or husking, work seldom commences before 7 a. m. and never, to our knowledge, before 6 a. m. Where foreigners are used, it is not unusual for work to commence at 4 or 4.30 a. m. when the rush of beans or corn is on. Where Americans are employed, the children seldom do other work during the day. The Italian children, however, when the crops are coming in, are frequently roused at dawn, snip till it gets light, and after the fields dry off from the night dew, they pick beans in the fields; and with nightfall go into the sheds and snip again.

Where American help is employed for snipping, the children are in some cases forced by their parents to do this work, as the following report of a "working investigator" indicates:

"Lucy D—— (11 years) came into the shed and said she didn't want to string. I asked her why she did it, and she said 'I've got to.' "

Cases where American mothers force their children to work are, however, the exception and not the rule, and even then they are not forced to work excessive hours. Many of the American children are eager to go to the sheds where there are so many other children and where they can earn a little spending money. With them the shed is a playground where they play at work till they get tired and then quit. A report of one investigator was:

"When Viola (7 years) saw me this noon she called out that she was going to the factory. I found Buster (4 years) in tears because he had just been told that he couldn't go."

There are unquestionably some cases of child exploitation, however, even in factories where American help is employed, when the sheds are kept open for work up to 14 hours a day. Such exploitation will always exist where the child is permitted to be an instrument of financial gain to parents or to employers. Since, however, no records are kept of the hours the children work, these instances could be discovered only by exhaustive study of individual cases which we were not able to make.

Where the snippers are foreigners exploitation is the rule and not the exception. The children are commonly driven to work for long hours. The case of Jack, mentioned above, is in point. The cannery keep the sheds open for labor and supply the beans or corn to be snipped or husked; the parents see that the children are there to work. This is illustrated from the following paragraph taken from the report of a "working investigator: "

"The parents are continually driving children to work. One little boy, aged 11, was throwing some bean snippings at another and had stopped work a second. His father hit him brutally across the face and set him to work. Everywhere parents are forcing the 'kids' to work."

Again the investigator reports:

"Nellie V—— says she is 10 but looked 8. She snipped from 4.30 a. m. to 7 a. m.; from 7.30 a. m. to 12 m.; from 12.30 p. m. to 5 p. m. She got up at 4 a. m. Liked to snip but was 'awful tired.' Said her mother made her keep at it."



CHILDREN SNIPPING IN "SHEDS."

One investigator who worked in the shed comments as follows on the difference in the attitude toward their work of the children at the beginning of the bean crop and later when the season is well under way:

“The difference in the attitude of the children toward snipping is very noticeable. At first, when there were only a few hours of work and they had lots of time to ‘help mother snip beans,’ they were full of play and acted like real children. Now they sit like little machines with their fingers tied up in rags and snip away all day long. If they start for home or evince any spirit of play they are promptly whacked or supplied with more beans by their parents.”

An incident which occurred at one factory, where a rule that no child under 10 be permitted to snip was put into effect, illustrates the greed of the parents for the earnings of the children. It happened that boys under 10 got into the shed and when the foreman attempted to put one out he fought to stay. His mother came to his rescue, throwing boxes, and finally managed to bite the foreman viciously on the arm. If the mother would thus fight to have the boy permitted to work, it may well be asked what she would do to the boy should he refuse to do so.

Nor are the parents entirely to blame. Their parental love has been dulled by hard necessity and they are victims of a system which gives them when they both work hard for 10 hours a day in the factory only \$2.75 a day.(7) If their family be large this is hardly enough to supply it with the common necessities of life.

Granted that the economic necessity is great, yet the fact remains that these children are often exploited because the State permits them to be instruments of financial gain to their parents and to their employers. Nor does it appear to us that a canner who pays such low wages can, with good grace, argue that the children should be permitted to snip to increase the meager earnings of the family.

EARNINGS OF CHILDREN.

The pay for snipping and husking varies in different factories. The following schedule shows the rate of pay per pound for snipping:

(7) See Chapter VIII.

| | |
|-------------------|--------------------|
| 4 factories..... | 1/2 to 1 cent |
| 24 factories..... | 1 cent |
| 1 factory..... | 1 to 1 1/4 cents |
| 1 factory..... | 3/4 to 1 1/2 cents |
| 6 factories..... | 1 to 1 1/2 cents |
| 1 factory..... | 5 cents, 3 lbs. |

Others pay according to the amount and not by weight. The prevailing rate, however, is one cent per pound. Where there is a varying rate per pound, the lower amount is usually the pay for wax beans, which are larger, easier to handle, and weigh more, while the higher rate is for the green "Refugee" beans.

The following table shows the rate of pay for husking:

| | |
|-------------------|--------------------|
| 3 factories..... | 2 cents bushel |
| 7 factories..... | 2 1/2 cents bushel |
| 39 factories..... | 3 cents bushel |
| 3 factories..... | 4 cents bushel |

The rates of pay are determined largely by the demand and supply of workers, though it seems also to remain at the rate custom has established until forced up. It is noteworthy that the factories paying less than one cent a pound for wax beans are all located in a certain district.

The earnings of the children vary, of course, according to the rate of pay. They vary also according to the application for the child workers which depends largely on their age. Little Jack (aged 12) made \$1.40 in about 17 hours, an average of 8.2 cents per hour. An American girl of 12 made 46 cents in 7 hours, or 6.5 cents an hour. Girls are said to be generally faster workers than boys, but clearly Jack had the greater application though he worked more than double the time of the American girl of the same age. In other cases a girl of twelve made 40 cents, a girl of seven, 10 cents, and a boy of four, 4 cents, in five hours. Clearly, age is an important factor in determining earnings. An American girl of 12 years made the following amounts on successive days: 46 cents, 45 cents, 40 cents, 21 cents, 56 cents, 64 cents. On days when she worked most of the day from 7 to 6, she made about 45 cents. The last two days she worked in the evening also and made more.

In general, our information leads us to believe that children under 10 years of age will average about 25 cents in a ten hour day; that those from 10 to 14 will average about 50 cents, and that those from 14 to 16 will nearly equal the work of a woman averaging about 90 cents for 10 hours. Foreign children usually work with greater application than American children and earn more.

Clearly when children work on beans and corn, approximating 20 to 40 days' snipping, and 20 to 35 days of husking, i. e., about 30 to 65 days of both, their earnings mount up to a considerable sum. This is the case even with the little ones. With the American children, the money thus earned is usually not a vitally necessary addition to the family income, though it is, of course, usually welcome.

A "working investigator" in a factory where Americans did the snipping reported:

"Most of the little girls with whom I have talked seem to have planned something special for their bean money. Lucy D—— said she hoped to get a bicycle, Julia R—— is going to buy shoes, Ernestine B—— wants to get some furs. Several said they were going to put it in the bank. I think there are, undoubtedly, children who are obliged to give at least part of their earnings to their parents, but I have not happened to speak with any who stated such to be the case."

With the Italians and Poles, the earnings of the children nearly always go into the general family budget. It seems, however, after a thorough consideration of the question, that the earnings of these children are not so vital to the support of the families as it would at first appear. Advocates of child labor legislation have often made the claim that child labor does not permanently increase the income of the families of the poor, since the children compete with their parents, and forces wages down to the point where the whole family income is no greater than what the wages of the adults would be were the children not forced into industry.

Whether, in general, this argument be wholly true or not may be questioned, but in this case it would seem that the foreign families imported from the cities benefit little in the long run

from putting their children to work as the canner never imports foreigners till he is driven by the absence of local laborers to do so. The foreigners will leave their homes in the city only when their total earnings in the cannery are sufficient to attract them. The cannery, being in the business for profits, not for philanthropy, pay them only enough to make it worth while for them to come. This amount is gauged not by the rate of pay of the mother or of the father, if he comes also, but by what the whole family can make during the canning season. If the children work, as they have been permitted to in the canneries, their earnings are taken into consideration by the Italians and Poles in determining whether it will be worth while for them to go to the canneries. If the children were not permitted to work, the canner would still be under the necessity of securing the labor of their parents, and unquestionably, in the long run, would be forced to pay the parents approximately what is now the total family income. No canner using imported labor in his factory has refused to permit children under 14 to work, so the proposition is almost entirely speculative. Cannery have tried to justify the child labor in the canneries by claiming that the foreigners would not come out from the cities unless their children were permitted to work, which is equivalent to saying that the present rates of pay for adults in the canneries are not, in themselves, sufficient to attract the foreigners. The only reasonable inference must be that if the cannery get the foreigners, without employing the children, the pay for adults must be increased from the present low rates.(1)

Conclusions, then regarding the earnings of the children are:

1. That while the earnings of the smaller children are not great, the earnings of those from 12 to 16 are considerable.
2. That the earnings of most of the American children are not necessary to the support of their families. In a few cases the earnings are unquestionably an important contribution to the family income.
3. That most of the earnings of the imported foreign children go into the family budget, but that, were the children not

(1) For full statement on pay of adults, see Chap. VII.

permitted to work, the pay of the parents, in the long run, would have to be increased pro rata (to make up for the amounts the children now contribute).

The State in enacting child labor legislation has established the principle that all children (the child of poor as well as of rich parents) should be protected from exploitation and be given a fair chance. If child labor in the sheds is not an abuse and has not led to exploitation of children, then it should not be prevented. If it is interfering with the normal development of children, which is our test, then it should be prevented, regardless of the children's earnings.

SHED WORK AND THE SCHOOL.

The cannery work is conducted for the most part while the schools are closed for the summer vacation. During that period, of course, the fact that the children work in the shed can in no way interfere with their education. The schools reopen, in the larger towns and cities, about September 6th. In smaller places school usually commences the third week in September, sometimes October 1st. Sometimes the last day of work on beans falls on about the same date. Very often, however, beans last till the 25th day of September, and sometimes into October. Corn very often is packed during the first two weeks in October. There is often, therefore, a chance for conflict between the school and work. Again, for discussion, we must separate the local American-born children and the imported foreign children.

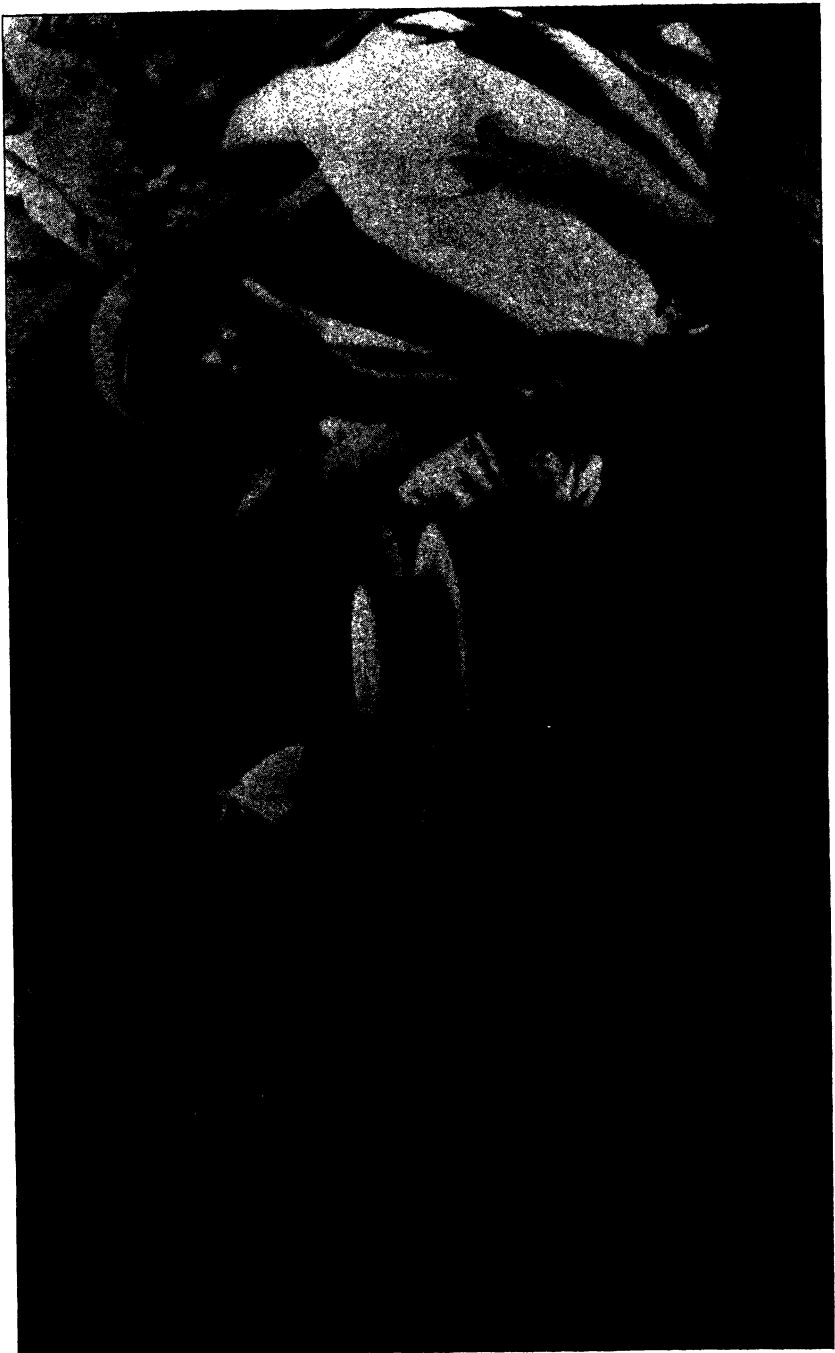
Where only American children are employed, the parents, for the most part, are anxious that their children attend school, the truant officers likewise are ready to see that they do so, and the cannery men are on their guard against employing them during school hours. Such is not always the case, however. At one factory fourteen children were found busily husking during school hours, and told the inspector their teacher had said they didn't need to come to school till 11 o'clock. At another, where eight children were husking during school hours, the school trustee had given them permission to stay out and husk till October, though school was in session.

As a general proposition, it is true, however, that American-born children do not work during school hours. But these children do work after school hours, on Saturdays, and occasionally at nights. After the school season had begun an inspector happened into one shed where American children were employed at 8.30 p. m. and found twelve children husking. Two were under ten, though signs were posted to the effect that no children under ten were to be allowed to work.

But while not many American children have their education seriously interfered with, such is not the case with the foreign children imported from the cities. They often leave the city before school closes in the spring and return after it opens in the fall, and their schooling is neglected. The cities from which these foreigners are drawn are shown as follows:

| | |
|---|----|
| Number canneries importing foreigners from Buffalo..... | 22 |
| Number canneries importing foreigners from Utica..... | 8 |
| Number canneries importing foreigners from Syracuse..... | 2 |
| Number canneries importing foreigners from Utica and
Syracuse | 2 |
| Number canneries importing foreigners from Buffalo, Roches-
ter and Syracuse:..... | 2 |
| Number canneries importing foreigners from Rome..... | 1 |
| Number canneries importing foreigners from Oakfield..... | 1 |
| Number canneries importing foreigners from Jamestown... | 1 |
| Number canneries importing foreigners from Buffalo and
North Collins | 1 |
| Number canneries importing foreigners from Buffalo and
Dunkirk | 1 |
| Number canneries importing foreigners from Rochester and
Mt. Morris | 1 |
| Number canneries importing foreigners from Rochester and
Syracuse | 1 |

It will be seen that Buffalo, Utica, Syracuse and Rochester furnish the majority of the workers, with Buffalo as the chief centre of supply. It is a curious fact that several canneries east of Rochester, instead of importing foreigners from Rochester,



CHIEF COUNSEL OF COMMISSION QUESTIONING SMALL SNIPPERS.

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which has a large Italian colony, bring them all the way from Buffalo. The schools in these cities closed June 21st in the spring of 1912, except in Utica, where they closed June 28th. Following are the dates when the foreigners came to the canneries the same year:

- Foreigners at 1 cannery left city May 27.
- Foreigners at 1 cannery left city June 1.
- Foreigners at 1 cannery left city June 3.
- Foreigners at 6 canneries left city June 15.
- Foreigners at 1 cannery left city June 16.
- Foreigners at 1 cannery left city June 19.
- Foreigners at 4 canneries left city June 20.

School closed:

- Foreigners at 3 canneries left city June 25 to 30.
- Foreigners at 11 canneries left city July 1 to 31.
- Foreigners at 8 canneries left city August 1 to 31.
- Foreigners at 4 canneries left city September 1 to 30.

It will be seen that the foreign schildren of 15 colonies left the city from 1 to 25 days before June 21st, when school closed. All but two of these colonies came from Buffalo. One was from Oakfield and one from Rochester and Mt. Morris.

The schools of Buffalo, Rochester, Syracuse and Utica opened in the fall of 1911 on September 5th and 6th. Following are the dates when the foreign colonies left the canneries in the fall:

- Foreigners at 2 canneries returned to city July 1 to 31.
- Foreigners at 2 canneries returned to city August 1 to 31.
- Foreigners at 2 canneries returned to city September 1 to 6.

School opened:

- Foreigners at 3 canneries returned to city September 7 to 14.
- Foreigners at 4 canneries returned to city September 15 to 30.
- Foreigners at 7 canneries returned to city October 1 to 14.
- Foreigners at 7 canneries returned to city October 15 to 31.
- Foreigners at 8 canneries returned to city November 1 to 14.
- Foreigners at 3 canneries returned to city November 15 to 31.
- Foreigners at 2 canneries returned to city December 1 to 9.

It will be seen that the foreigners of 34 out of 40 colonies returned to the city from a few days to 95 days after school started, and that about half returned at least 40 days late.

In a few cases the children are sent on ahead of their parents, so as not to miss schooling, and stay with friends or relatives till their parents follow; a few of the parents return, while there is still work at the cannery, to put their children in school; but these cases are the exception and not the rule.

Did the children attend the schools in the cannery towns they would still be thrown considerably behind their classes in changing from one school to another; but the fact is they seldom attend those schools. In but 3 out of 45 colonies did they do so.

In 1910 the writer made, for the New York Child Labor Committee, a detailed investigation of the school records of these children in the three Buffalo public schools having the largest attendance of Italian children. One hundred and three children were found who said they worked in the cannery sheds, 231 who "went to the country," the majority of whom went to the cannery colonies. The 103 children averaged 11 years 5 months, and ranged in age from 5 to 15 years. They missed on an average 34.1 actual days of schooling, ranging from 11 to 71 days missed. The school record of these children was as follows:

| | |
|------------------------------------|-----|
| Passed with clean record..... | 36 |
| Failed in one subject, passed..... | 6 |
| Conditioned | 17 |
| Lost a class | 35 |
| Transferred to another school..... | 9 |
| <hr/> | |
| Total..... | 103 |
| <hr/> | |

Of these whose records were secured, 55 per cent of either lost a class or were conditioned; and 6 of the 42 who passed successfully failed in one subject. Many of these children go out to the canneries year after year, often making but half a grade during the winter. The result is that many of them are turned out from schools at 14 or 16 with hardly an elementary education.

There can be no question that the mental development of these children is very seriously arrested by their going to the canneries.

That it is the result of their employment at snipping and husking is not so clear. Often they stay at the cannery some time after the snipping and husking is done. Clearly, in that case, their employment at these occupations is not the cause of their losing schooling. It is our opinion, however, that employment is responsible in some cases.

As said before, some parents send their children back to the city to stay with relatives or friends when school opens. Were the children unable to earn money by staying at the cannery this number would, unquestionably, be larger. Were they unable to earn money, more would be likely to attend the schools in the cannery towns before returning to the city. Moreover, the fact that the children are able to earn money for the canner and for their parents stands in the way of any solution of the difficult problem presented, for neither the canner nor the parents are anxious to have the children taken from work and put in school. Their earning capacity is the stumbling block to their proper mental development.

One canner, who maintains a very large foreign colony, realized the great handicap the children were under through missing school in the city and set apart a building for a school and employed two teachers. The motive in establishing this school is worthy of commendation; and the school has undoubtedly accomplished much good. That it has made up for the regular schooling missed by the children we very much doubt, and the reason for its failure has been that simultaneously with their study the children have been employed extensively in the sheds and in the fields. The truth is that some of the worst cases of child exploitation were found at this factory. In 1911 there was no limitation on the age of child workers; in 1912 but few children under 10 were admitted to the sheds. Children have been employed for both snipping and husking, though next year it is the present plan of the company to use husking machines entirely.

The result of the employment of the children has been that the teachers have been unable to maintain any regular course of study. One day the children have been in school, the next day at work. During the bean season the school assumed the aspect of a kindergarten, the older children all being at work picking or snipping beans.

This case illustrates the difficulty which prevents any solution of the cannery-school question as long as the children are permitted to be instruments of financial gain to employer or parents. That the children's schooling will be inevitably neglected is the opinion of the North American Civic League for Immigrants, at whose suggestion the school at this cannery was established.

Under present conditions the solution of this problem is most difficult. The parents prefer the children's earnings to their education. The canner usually wants their labor. The local school authorities do not raise a finger toward putting them in the local school. At one factory the manager tried to have the children go to school, but received no co-operation from the local truant officer who refused to adopt compulsory methods.

The unwillingness of the local school authorities to have these Italian and Polish children crowded into their schools for a few weeks in the fall or spring is not hard to understand. Feeling against these foreigners is often strong in the cannery towns. But besides this, it is clear that to admit the foreign children would greatly disorganize the schools, forcing them for a few weeks to accommodate and provide temporary facilities for twice as many children as they would have throughout the winter. In some cases it would crowd the school buildings beyond their capacity. The local taxpayers often lack the vision to see what the failure to educate these foreigners means to the State and nation. They feel that the education of the Italian and Polish children is not their problem, and that they should not be taxed to pay for the education of children whose parents are untaxed foreigners of temporary residence. It is perhaps too altruistic to expect these people to view the presence of these colonies in their midst as an opportunity to help solve one of our difficult social problems,— the hastening of full fledged Americanization of foreigners. Such is not the case, and so all of the three factors involved,— the parents, the canners and the local school authorities, are either indifferent or actively opposed to the children's going to school.

Clearly to solve the problem the situation must be reversed. It is our opinion that it can be done: first, by prohibiting the employment of the children; secondly, by authorizing the State Education Department, where there is a large colony, to establish

schools, and where there are only a few foreign children, to lend financial assistance to the local school authorities on condition that they educate the foreign children.

To prohibit the employment of the children will take away all objections of the parents, and of the canners, to the children's attending school. It will probably align them actively in favor of it. To have the State Education Department establish schools where there are large colonies will meet the situation there. To have the State Department subsidize the local school authorities to aid in the education of the foreign children where there are not many, and then rigidly use their authority to withhold all State school moneys unless these children are educated, will serve the purpose in such places. Until these steps are taken, it is our opinion that the education of these children will continue to be neglected year after year, and they will have less than a fair chance to develop into intelligent and efficient citizens.

There are in all sixty-one factories in the State packing beans. Of these, 30 use children for snipping, twenty-five use no children, and six send beans into the homes of the workers to be snipped. In other words, half of the factories canning beans employ no children. The following table shows for the ten factories packing the largest number of cases of beans in the State — given in order according to the size of their pack — whether or not they employ children for snipping:

| | | |
|---------|--------|--|
| Factory | No. 1 | Employs children. |
| " | No. 2 | Employs children. |
| " | No. 3 | Employs no children. |
| " | No. 4 | Sends beans into homes. |
| " | No. 5 | Employs children. |
| " | No. 6 | Employs children. |
| " | No. 7 | Employs no children. |
| " | No. 8 | Employs children. |
| " | No. 9 | Employs children. |
| " | No. 10 | Employs no children: part of snipping done in homes. |

It will be seen that of the ten largest packers of beans in the State, three do not employ children, but have all bean snipping done in the factory proper, while a fourth snips most of the beans at the factory, sending small amounts into the homes.

There are in all seventy-six canneries in the State packing corn. We have information from sixty-eight of these as to

whether they use children or not for husking. Twenty-three do so, and forty-five do not. In other words, approximately two-thirds of the canners pack corn without employing child labor for husking.

Of the above twenty-three factories which employ children for husking, twelve are also among those which employ children for snipping. This makes the number of factories using children in their sheds on either beans or corn total to forty-one.

The following table shows for the ten factories packing the largest number of cases of corn — enumerated in order of the number of cases packed — whether or not they employ children for husking.

| | | |
|---------|-------------|----------------------|
| Factory | No. 1..... | Employs children. |
| " | No. 2..... | Employs no children. |
| " | No. 3..... | Employs no children. |
| " | No. 4..... | Employs no children. |
| " | No. 5..... | Employs no children. |
| " | No. 6..... | Employs no children. |
| " | No. 7..... | Employs no children. |
| " | No. 8..... | Employs no children. |
| " | No. 9..... | Employs no children. |
| " | No. 10..... | Employs children. |

Only two of the ten employ children. One of these two factories has the largest output in the State. The owner of this factory says that he expects to introduce corn husking machines in his factory next year, and thus entirely replace child labor.

From the foregoing facts it will be seen that child labor cannot be considered an established labor condition of the New York State canning industry. While many factories still employ children, and a large number of children are at present employed in the industry, many canners have voluntarily and successfully eliminated child labor from their establishments. This fact has an important bearing upon the question of the necessity of child labor in the industry, as may be seen later.

IS CHILD LABOR NECESSARY IN THE INDUSTRY?

From the fact that one-half of the bean canners and two-thirds of the corn canners of the State, including in each case some of the largest packers, operate without employing children, the logical deduction would be that child labor is altogether unnecessary in the canning industry. Such a statement, however, needs qualification and explanation.

Few persons will make the claim that the successful packing of corn demands child labor. Within the last three years husking machines have been perfected which husk corn in a most satisfactory way and are rapidly being installed in the corn canneries of the State. Of the ten largest packers of corn, only two employed children for husking in 1912, and one of these will replace them with machines in 1913. The use of children for husking is yearly being confined more and more to the smaller canneries, and it is but a question of time before husking will be done entirely by machine. The only effect of a law prohibiting the employment of children for husking would be to hasten the day when this will be true. In the long run it would probably prove a benefit, not a detriment, to the industry. It should meet with but little opposition from the canners.

When it comes to bean snipping, the problem is more complex. While inventors have been ingeniously working to produce a mechanical bean snipper, no practical machine has as yet been put on the market. Snipping must be done entirely by hand, and consequently more labor is required to pack a case of beans than to pack a case of peas, which are shelled by machinery, or of corn, which may be machine-husked. Since most canneries are located in towns or cities of limited population, the problem of securing snippers is not always easy.

Whether any particular factory can or cannot get along without child snippers depends very largely upon the relation between the size of the town and the size of the pack of beans which the canner turns out. A canner attempting to pack a large quantity of beans in a small town finds his adult labor supply insufficient for his snipping, unless he imports foreigners for the work. For him child labor is "necessary." So it happens that some factories in small towns pack beans and do not employ children; while other factories with a much larger supply of labor claim that "child labor is necessary in the industry." It is necessary, under their methods of conducting the business.

Clearly the many canners who pack beans without employing children have proven that child labor is not necessary to the successful packing of beans in the State. It is for the State to decide whether a canner has a right to contract for an acreage of

beans, the product of which he knows will be more than his available adult snippers can handle, and then claim that "child labor is necessary."

A law prohibiting the employment of children under 14 years for snipping would, of course, in no way affect the 50 per cent of the canners who now pack beans without child labor. They would continue successfully to conduct their business along the lines on which they now conduct it. In the case of the other 50 per cent of the canners who now use children for snipping, a change would be necessary. They would be forced either to reduce their pack to equal their present supply of adult snippers, or get more adult snippers to replace the children. The latter method might be accomplished by increasing the pay for snipping so as to attract more snippers, or by importing foreigners from the cities to do the work. A universal rule which applies to small towns as well as large cities is that the higher the wages, the larger the number of workers who will be attracted by them.

At certain factories, higher rates are paid on some crops than on others, due to the necessity for a larger number of workers, or to competition with fruit drying plants which open up in the fall. At Rome, New York, the following testimony was taken by the Commission:

"Q. Have you had 1,000 to 1,200 people there? (referring to shed). A. We have at times.

* * * * *

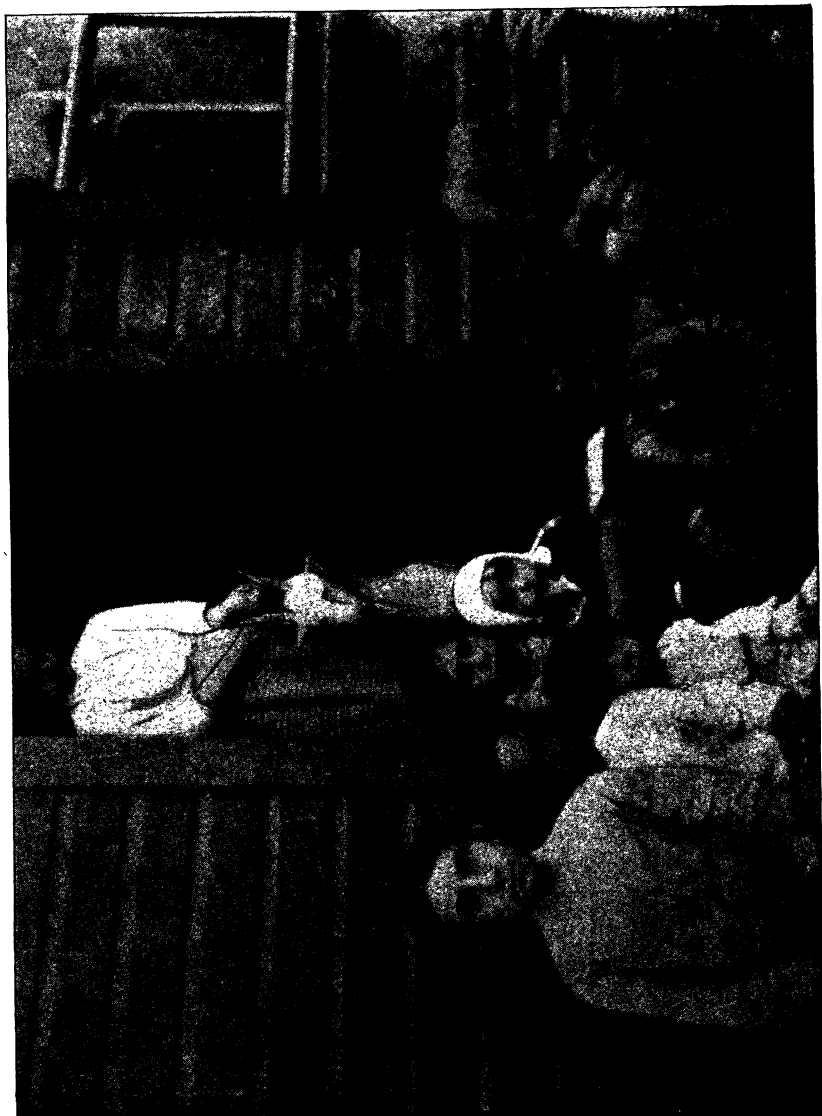
Q. Well then, why can't you at ordinary times use only children over 14 and women? Then you would not have this question come up of employing children under 14. A. There are not enough of them, Counsellor.

Q. Well, you say yourself you have as many as 1,200 people come here. A. They have come under especially favorably circumstances.

Q. They don't get any more money, do they? A. Not per pound.

Q. What do you mean by especially favorable conditions? They could work longer hours? A. No, sir; those would be times when beans have got very large.

Q. They would make more money? A. They can get more beans. (They can snip more pounds of beans.)



A GROUP OF CANNING CHILDREN. GOAT IN DOORWAY LIVES IN WITH FAMILY.

Q. Does that attract them? A. Sure."

Clearly the supply of snippers is very closely related to the amounts they can make, and the economic law that higher pay attracts more workers applies in canning factories as well as elsewhere. It is significant in this regard that among the five largest bean packers, the two who do not employ children under 14 for snipping, pay a slightly higher rate for snipping than the three who use them. One way, therefore, of securing adults in the place of children, is to increase the rate of pay. Another is to bring out more adult foreigners from the cities. The supply of Italians and Poles who are available for this purpose is far from exhausted. Padrones at certain factories told investigators that they could get four times the number of families they now secure for work in the canneries. Here again it is a question of wages. If more foreigners could not be secured at the present wage rate certain factories are paying, undoubtedly they could be were wages increased and better housing accommodations provided.

Our conclusions, therefore, regarding the necessity for child labor in the canning industry are:

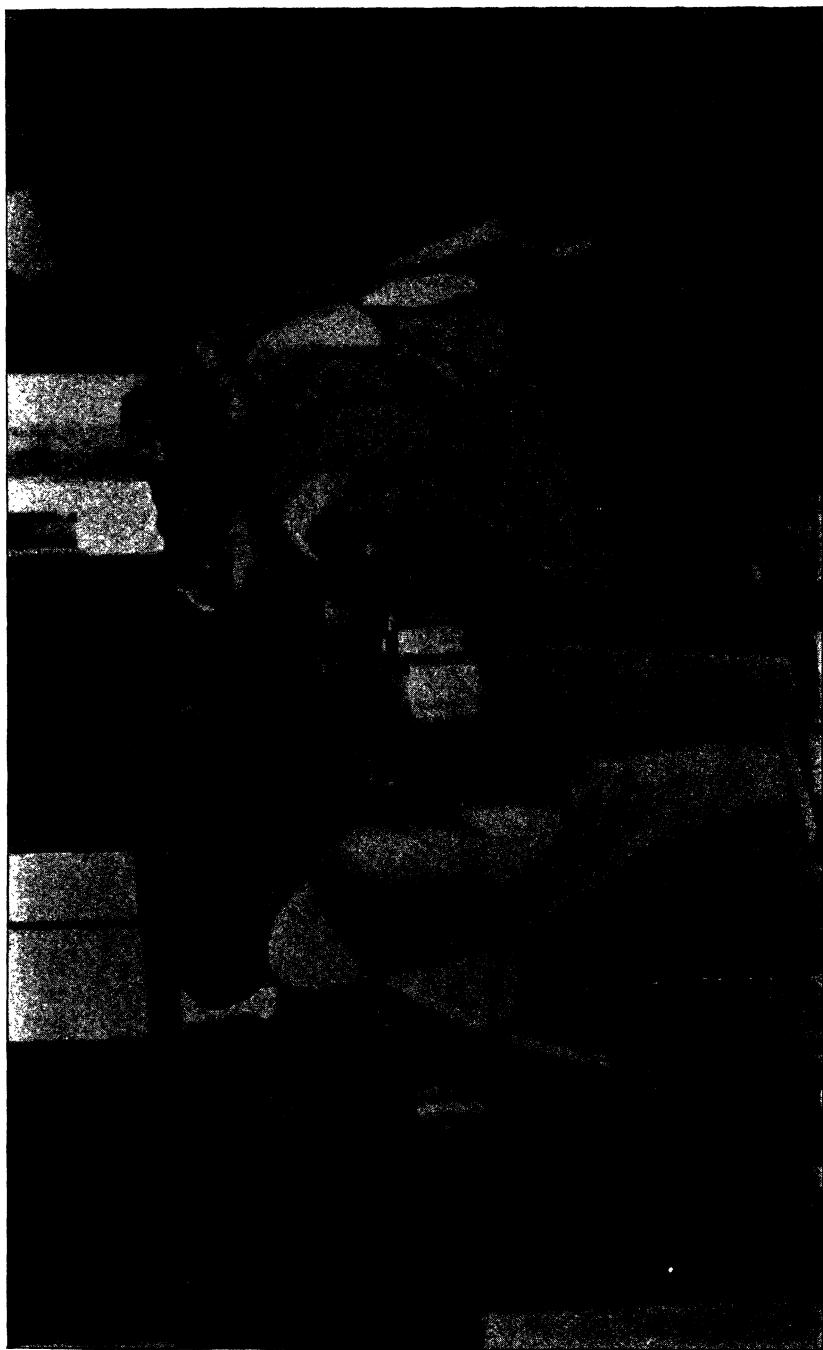
1. That the employment of children for husking corn is altogether unnecessary, since satisfactory machines have been perfected to do this work.
2. That child labor is unnecessary to the successful packing of beans in the State, since half of the canners of beans, including some of the largest packers, do not employ children.
3. That those canners who now employ children for snipping beans may eliminate them by adjusting their bean pack to the capacity of their present supply of adult snippers, or by increasing their supply of adult snippers to equal the demands of their present pack.

ARE CHILDREN EMPLOYED TO GET PARENTS' LABOR?

Some canners have disclaimed any desire to employ the children, especially the younger ones, but contend that the labor of their parents is necessary and that it cannot be secured unless the children are allowed to accompany them to the factory. To throw light upon the validity of this claim, each child found em-

ployed in the cannery sheds was asked whether he or she came to the factory alone or with parents or relatives. Of the 1,259 children under 16 years of age employed in the sheds, 754 came alone, while 505 came with their parents. It is especially significant that of the children found working in the shed of the canner who has most frequently advanced the above argument, over 90 per cent came to the factory alone. Investigation showed that foreign children were usually with their parents, but that the American children generally came to the factory alone.

Clearly the majority of the children are employed for their own productive capacity, not to secure the labor of their parents. Two factories were found which provided places for the children to stay while their parents were at work, and hired care-takers — an inexpensive expedient by which any canner may secure the labor of parents without employing children.



Sorting Berries. Note Poor Seating.

CHAPTER III

NATURE OF WORK OF WOMEN.

The question whether the hours of women should be restricted in the canning industry as in other industries, or whether, on account of the seasonal character of the business, factories engaged in the canning and preserving of fruits and vegetables should be especially privileged to employ women for longer hours has long been a point of dispute between factory owners and organizations interested in labor legislation, not only in this State but in other States and in European countries. The Legislative Committees' rooms at the State Capitol have been the scene of frequent battles. On the one hand it has been claimed that these canning factories are situated among the fields, and that work in them is more akin to agricultural than to factory labor. It has been argued, further, that the hours of labor are determined entirely by weather conditions, and that the canner must handle the crops when they come in, regardless of hours. On the other hand, it has been asserted that regular work in canning factories as performed by women has all the elements of the factory system and that the hours women work are at times a public scandal. Very often the two sides have talked of different things. Those wishing to have the hours restricted have come telling of the exploitation of workers, with no information upon the industry's demands, while representatives of the canners have told only of the "Lord's ripening the crops," and claim that it was impossible to keep the hours of labor within any fixed bounds. It is not to be wondered, therefore, that outsiders have been perplexed and that members of the Legislature have often been uncertain as to what action should be taken. At the last session of the Legislature, in order to secure the passage of the bill fixing the hours of women in factories at 54 per week, the canners who had previously been under the 60-hour law, were given a complete exemption.

The present investigation, starting out where former investigations had left off and benefiting by their accumulated knowledge, was in a particularly fortunate situation. It is our hope that we may be able to talk in the language of both sides; present

the needs of the workers along with the demands of the industry, and relate the two so that the public as well as the members of the Legislature may at least have the facts before them which will permit them to form an intelligent opinion as to the existing conditions in the canneries.

One of the main purposes of this inquiry has been to furnish information on which the Legislature may determine how many hours per day and week the State of New York should permit women to work in the canning industry. The legal basis for all laws restricting women's hours of labor is the protection of their health by preventing long hours of exhausting labor. Our investigation has been industrial, not medical. We can, therefore, present no information as to the physical condition of women before and after work; but we can and shall present full information regarding the hours women work and the conditions of their labor.

The strain of work on the worker is measured by two factors: the hours of labor and the conditions under which the work is carried on. In presenting the information gathered we shall, therefore, first give a detailed description of the tasks to which women are assigned in the canneries, describing their working conditions fully; secondly give facts regarding the hours of labor; and finally show the reasons for long hours in the industry and discuss methods for their prevention.

CONDITIONS OF LABOR.

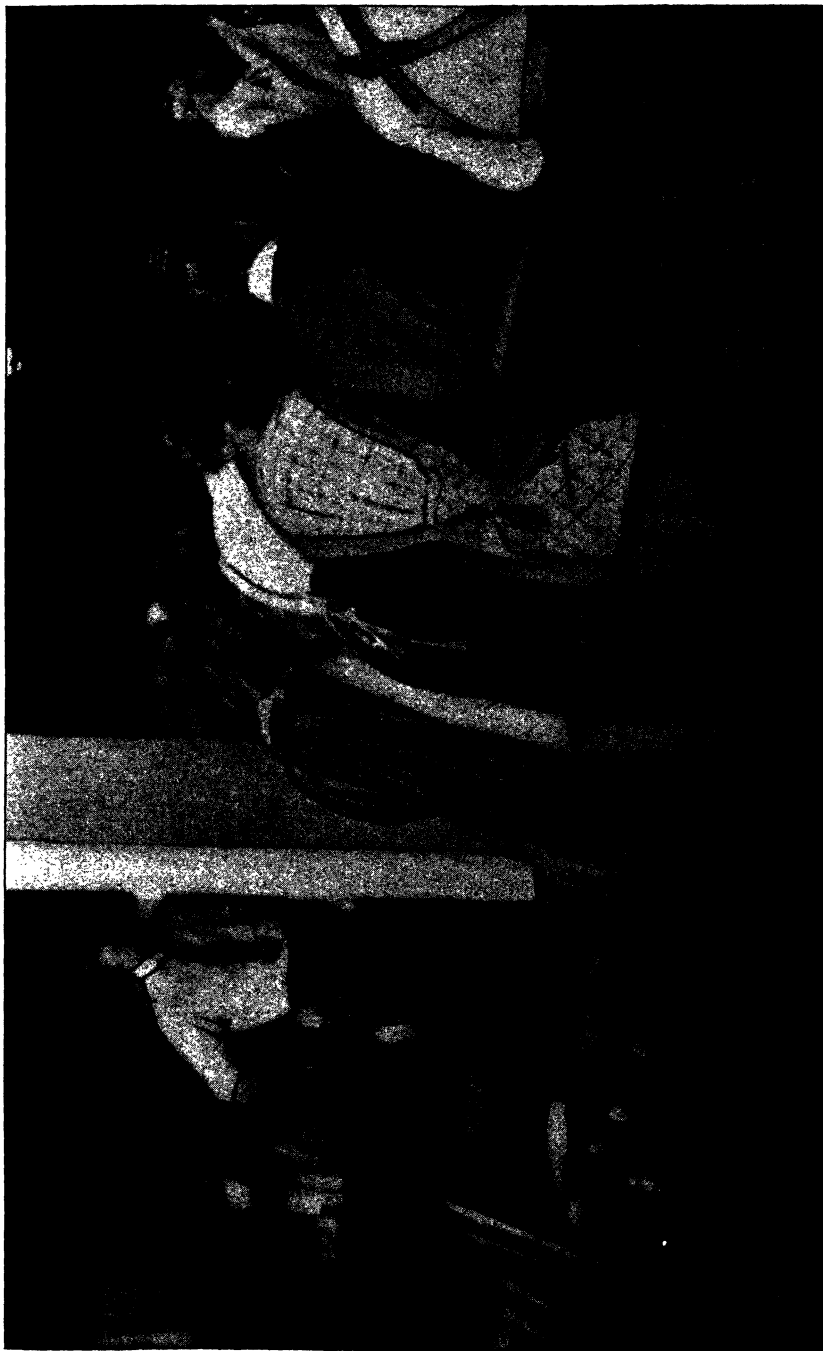
According to our best estimate, approximately 7,000 women were employed in the New York State fruit and vegetable canneries in 1912.(1) The conditions under which these women worked varied from factory to factory and according to occupation. To get as accurate information as possible relating to those conditions, investigators filled out schedules for twenty women in each factory, selecting them so as to represent the different tasks on which women were employed. The investigator stood at the women's elbows and graded the light, heat, noise and ventilation on the scale of A (excellent, not easily improvable), B (good, not perfect but satisfactory), C (fair, not totally bad but not worthy of approval), and D (bad, worthy of absolute condemnation). The results are shown in the following table:

(1) Does not include shed workers or women employed in pickle factories, fruit drying establishments, or fish canneries.

TABLE VII.
CONDITIONS OF LABOR OF WOMEN WORKERS IN THE CANNERIES.

| | Total number. | LIGHT. | | | | | HEAT. | | | | | NOISE. | | | | | VENTILATION. | | | | |
|--------------------------------|---------------|--------|-------|-------|-------|-----------|-------|-------|-------|-------|-----------|--------|-------|-------|-------|-----------|--------------|-------|-------|-------|-----------|
| | | | | | | | | | | | | | | | | | | | | | |
| | | A. | B. | C. | D. | Un-known. | A. | B. | C. | D. | Un-known. | A. | B. | C. | D. | Un-known. | A. | B. | C. | D. | Un-known. |
| Shelling beans..... | 20 | 9 | 6 | 4 | ..... | 1 | 12 | 1 | 3 | ..... | ..... | 13 | 2 | ..... | 5 | 11 | 1 | 7 | ..... | 1 | |
| Peeling tomatoes..... | 42 | 19 | 16 | 7 | ..... | ..... | 8 | 31 | 8 | ..... | ..... | 14 | 22 | 6 | ..... | 5 | 15 | 30 | 4 | 3 | |
| Peeling beans..... | 8 | 8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 8 | ..... | ..... | ..... | 8 | ..... | ..... | ..... | ..... |  |
| Steaming cherries..... | 84 | 39 | 31 | 13 | ..... | 1 | 65 | 16 | 2 | ..... | ..... | 1 | 36 | 26 | ..... | 1 | 34 | 15 | ..... | 1 | |
| Sorting cherries..... | 172 | 76 | 40 | 55 | ..... | ..... | 1 | 100 | 67 | 4 | ..... | ..... | 21 | 55 | 36 | ..... | 1 | 82 | 8 | 1 | |
| Sorting beans..... | 433 | 226 | 182 | 13 | 11 | 1 | 220 | 175 | 20 | 1 | ..... | 17 | 23 | 140 | 190 | 46 | 34 | 222 | 180 | 55 | 6 |
| Sorting peas..... | 155 | 37 | 73 | 43 | 1 | ..... | 1 | 102 | 41 | 5 | ..... | 7 | 13 | 36 | 42 | 61 | 3 | 44 | 59 | 49 | 2 |
| Feeding corn cutters..... | 9 | 9 | ..... | ..... | ..... | ..... | ..... | 9 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 9 | ..... | ..... | ..... |
| Filling and weighing cans..... | 151 | 62 | 64 | 18 | 2 | 5 | 63 | 63 | 16 | 5 | ..... | 4 | 8 | 66 | 64 | 10 | 3 | 50 | 70 | 24 | 4 |
| Putting on caps..... | 56 | 31 | 28 | 12 | 3 | 2 | 6 | 16 | 29 | 4 | ..... | 1 | 12 | 25 | 16 | 4 | 11 | 21 | 20 | 3 | 1 |
| Inspectors..... | 16 | 4 | 10 | 2 | ..... | ..... | 2 | 5 | 6 | 3 | ..... | ..... | 1 | 12 | 3 | ..... | 6 | 6 | 3 | 1 | ..... |
| Wrapping cans..... | 8 | 8 | ..... | ..... | ..... | ..... | 8 | ..... | ..... | ..... | ..... | ..... | 8 | ..... | ..... | ..... | 7 | 1 | ..... | ..... | ..... |
| Labeling..... | 39 | 17 | 15 | 5 | 2 | ..... | 23 | 15 | ..... | ..... | ..... | 1 | 22 | 11 | 5 | ..... | 20 | 12 | 2 | 4 | 1 |
| Forewomen..... | 9 | 5 | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | 3 | 5 | 1 | ..... | ..... |
| Dropping cans..... | 22 | 10 | 10 | ..... | 2 | ..... | 8 | 5 | 6 | 1 | ..... | 2 | 14 | 2 | 4 | ..... | 2 | 9 | 19 | 2 | 2 |
| Stamping cans..... | 10 | 5 | 4 | 1 | ..... | ..... | 5 | 1 | 3 | 1 | ..... | ..... | 2 | 6 | 2 | ..... | 4 | 3 | 3 | ..... | ..... |
| Miscellaneous..... | 40 | 11 | 23 | 5 | ..... | 1 | 12 | 16 | 8 | 1 | ..... | ..... | 3 | 7 | 12 | 7 | 1 | 7 | 14 | 15 | 3 |
| Total..... | 1,274 | 547 | 512 | 178 | 21 | 16 | 642 | 461 | 111 | 17 | 43 | 208 | 431 | 429 | 148 | 58 | 523 | 502 | 207 | 23 | 19 |

Inspectors also noted whether women were required to do heavy lifting and carrying, whether the floors where they worked were wet or dry, and what kind of seats were provided.



PEA SORTERS. AN EXAMPLE OF POOR SEATING.

It is difficult to convey an impression of the actual strain of the work in a mere presentation of figures. They need to be interpreted into terms of flesh and blood.

When 16 per cent of the women work where the light is not good, it often means steady eye-strain day after day.

When 11 per cent work where the heat is excessive and 19 per cent where the ventilation is only fair or poor, it means that women who work under these conditions will reach the point of fatigue more quickly than those who work where light and ventilation are good.

Nearly one-half (47 per cent) of the women work amid a steady grind of machinery, sometimes so great as to prevent conversation. It is not a criticism of the factory owners, for great noise always attends the operation of certain indispensable machines in connection with which large numbers of women are employed. The fact is presented only because it is an important consideration in measuring the strain the women are under in a 9, 12, or 20-hour day.

Only 2 per cent of the women do heavy carrying and but 3 per cent heavy lifting. The strain on the women who do heavy lifting and carrying is undoubtedly great, but most factories employ men for work of this character.

It is a matter of common knowledge that it is bad for women, especially at certain times, to get their feet wet. In the canneries the floors were wet where 19 per cent of the women worked, and many were forced to work day after day with wet feet. Often wet floors are due to carelessness; often to processes, where it is most difficult to keep them dry. In these latter cases, wet floors are a condition of the industry which must be taken into consideration when the hours of labor for women are fixed.

Five per cent of the women are not provided with seats. Of the 95 per cent who were so provided, 77 per cent had seats with no backs. Often they were of an improper height for the work performed. One woman investigator, who worked in a factory, reported:

"The stools are too high for the labelers to be seated comfortable."

Another woman investigator working at the labeling machine reported:

"No seats for us who label. There is constant complaint. One woman said she had worked three years and never had a seat, and her legs 'nearly dropped off standing up.'"

Obviously a woman seated in a chair of the proper height and with a comfortable back is subjected to less strain in ten hours of work than a woman who stands, or one who is seated on a box of inconvenient height. And when the hours exceed ten, the difference in the fatigue of the workers will be even more emphasized. For this reason seating of the women cannery workers should be taken into consideration when the hours of labor are fixed.

DAINGEROUS MACHINERY.

Another condition which throws light on whether agricultural or factory conditions obtained in the canneries is the presence of dangerous machinery. Projecting set screws on power driven machinery, and unguarded belts, chains and pulleys are commonly found throughout the industry. Much of the machinery used on one crop is not used on others. A factory inspector will visit a factory during the pea season and order all machinery guarded. Three weeks later, when the pea machinery is idle and the bean machinery set up, the conditions may be entirely different, and often dangerous machinery will be exposed.

The following table shows the accident rates in the canning industry and in the other industries which employ large numbers of women:

TABLE NO. IX.

ACCIDENT RATES PER 1,000 EMPLOYEES IN CANNERIES AND OTHER INDUSTRIES EMPLOYING
A LARGE NUMBER OF WOMEN FOR THE YEARS 1908-1910.

| INDUSTRY. | Total
number of
wage
earners. | Percentage
of women
16 years
and over
employed. | Total
number of
accidents. | Number
of accidents
per 1,000
employees. |
|--|--|---|----------------------------------|---|
| Sheet metal work..... | 42,259 | 11.5 | 1,421 | 33.6 |
| Dynamos, motors and elec-
tric engines..... | 50,500 | 10.0 | 1,655 | 32.7 |
| Lead pencils and crayons... | 5,850 | 55.0 | 17 | 2.9 |
| Boots and shoes..... | 60,052 | 33.4 | 381 | 6.3 |
| Paper goods..... | 60,829 | 58.9 | 595 | 9.8 |
| Printing and book making. | 185,493 | 23.3 | 869 | 4.7 |
| Silk and silk goods..... | 38,126 | 64.9 | 103 | 2.7 |
| Wool manufactures..... | 66,979 | 43.3 | 777 | 11.6 |
| Hosiery and knit goods.... | 93,019 | 62.6 | 723 | 7.8 |
| Men's garments: | | | | |
| Tailoring..... | 224,706 | 31.8 | 62 | 0.3 |
| Shirts, collars and cuffs.. | 77,278 | 72.9 | 195 | 2.5 |
| Women's garments: | | | | |
| Dressmaking..... | 263,844 | 52.8 | 44 | 0.2 |
| White goods..... | 38,275 | 87.4 | 11 | 0.3 |
| Artificial flowers, feathers
and millinery..... | 54,167 | 81.2 | 3 | 0.0 |
| Laundries (non-Chinese)... | 46,627 | 71.5 | 87 | 1.9 |
| Tobacco..... | 88,240 | 51.5 | 82 | 0.9 |
| Fruits and vegetables (can-
ing)..... | 28,146 | 50.8 | 140 | 5.0 |

Multiplying the cannery accident rate by 3, because the industry operates but four months of the year, we get the *comparative* accident rate, 15.0.

These figures show that the accident rate in the canneries, 5 to every 1,000 employees, is greater than in many other industries in which women are largely employed. If the fact that the canneries are operated only four months of the year be taken into consideration, it will be seen that the *comparative* accident rate in the canneries, 15 to every 1,000 employees, is larger than in any of the industries enumerated.

DESCRIPTION OF WOMEN'S TASKS.

To present a picture of the tasks to which women are assigned in the canneries, let us start with the raw materials as they are delivered at the factory and follow them through the different processes until they are ready for shipment, noting as we go along each task at which women are employed, and the conditions under which they work.

Here we have them: the peas on the vines, the beans unsnipped, the corn in the husk, the strawberries with hulls, other berries unsorted, the cherries unpitted and with stems, the tomatoes, pears,

apples, beets, etc., unpeeled. How are they to be prepared for the consumer?

In their preparation much ingenious machinery is used. We have already seen in the chapter on Child Labor that corn husking is often done by machinery. So, too, the pea vines are fed into a "viner" out of which come the shelled peas. Cherries are fed into a machine which punches out the pits. Apples are fed into a machine which cores and pares them.

Apple-paring machines are usually operated by women. Sometimes these machines are operated by hand — more often driven by power. When power machines are used the work is machine-paced, and often the speed is great. Apples, however, are not quickly perishable, and the hours on this work are not a point in dispute. The apple season comes after October 15th, and the women working on them now come under the Fifty-four Hour Law.

At one factory women were found feeding the cherry pitters. This work requires constant standing and lifting of heavy baskets above the waist line. To the writer of this report, who has had the experience of feeding one of these machines throughout a cherry season, the work seems totally unsuited to a woman.

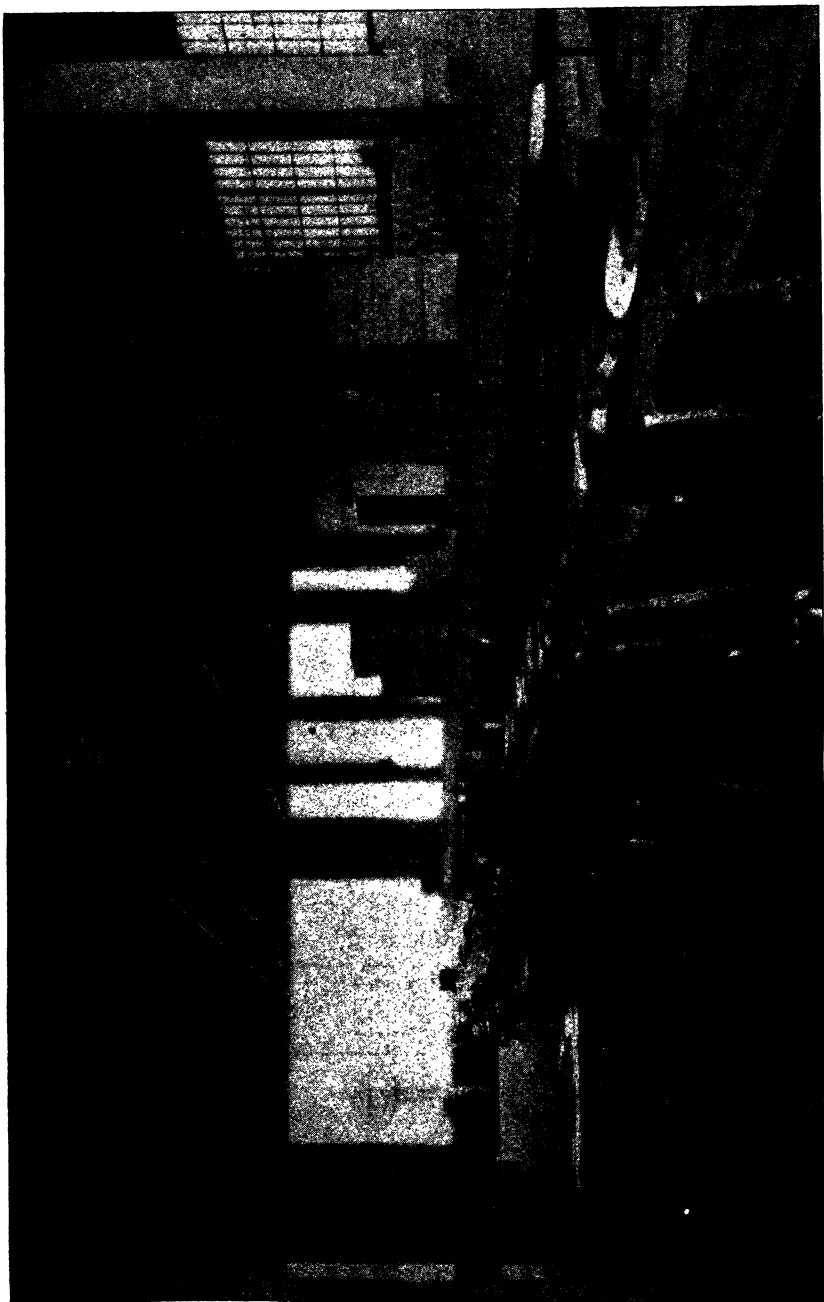
Men are almost altogether employed for feeding pea viners and corn cutters.

HAND PREPARATION OF PRODUCTS.

The other tasks in the preparation of fruits and vegetables, the hulling of strawberries, sorting of other berries, stemming of cherries,(2) snipping of beans, peeling of pears, beets, tomatoes, etc., are performed by hand. For these tasks large numbers of women are employed.

The snipping of beans and what husking of corn is still done by hand are carried on in the sheds, and have been fully described in the last chapter. The hulling and picking over of berries, stemming of cherries, and the peeling of pears, are very much alike in the demands they make upon the workers. Seats are usually provided for the women, and the work is comparatively light. As these products are expensive and require careful handling, the pay is usually by the hour, and consequently there

(2) A cherry stemmer has been invented but is not a success.



GOOD SEATING AT ONE FACTORY. NOT TYPICAL.



is little speeding. The light, heat, noise and ventilation where this work is carried on are generally very good. The chief strain is the nervous one of doing one task hour after hour and day after day.

TOMATO PEELING.

The peeling of tomatoes is not carried on under such favorable conditions. It seems to be the consensus of opinion among the canners, and it is, therefore, probably the fact, that women can perform this work more rapidly when standing than when seated. Many canners do not provide seats for these workers. The tomatoes are first scalded and then carried to the workers in pails. Often they are steaming hot and fill the air with vapor. The peeling is done with knives, also by squeezing the tomato with a quick twist. The whole process is decidedly damp. The floors usually become wet, and the workers themselves are often soaked unless protected by waterproof aprons, which are furnished at a few factories. At certain factories the women must carry twelve-quart pails of tomatoes from the scalding to their tables, and, when peeled, from the table to the "checker." Following is a description of the process at one of the factories where the worst conditions prevail:

"Sixty-eight women and eight girls between 14 and 16 years of age standing, peeling tomatoes. Floors damp and air laden with steam, especially near scalding. Women carry dishpans of tomatoes to tables from scalding, and pails from tables to checking place, a total distance of about 36 paces. The weight of the pans and pails was about 25 pounds each. Superintendent said at four cents a pail women averaged \$1.50 a day. This means carrying about four loads an hour or 37½ a day. Owner said it did women good to stand and carry pans and pails: 'It gives them exercise,' he said. No seats were provided for tomato peelers except for one very stout woman. Inspector noticed that owner had in his office an upholstered chair with a back."

Other factories maintained better conditions. Several provide men or conveyors to carry loads, and a few have installed porcelain sorting tables with little basins at each place where women sit to peel tomatoes. The strain on the women who work under these improved conditions is negligible in comparison with that suffered by others whose working conditions are bad.

SORTING.

Before being placed in the can, peas, beans, and corn go through various processes. After peas come from the viner they go through a cleaner which, by an air current, blows out much foreign matter. They then pass through a grader, which separates them according to size. Still there remain in the peas thistles, pieces of pods, broken particles, etc. To remove these the peas are run over "sorting tables" or moving belts, along the sides of which women sit and pick out foreign matter.

Beans are run through graders after being snipped in the sheds, and from there pass directly to the sorting tables. The graders do not grade perfectly, so the women besides removing the foreign matter or picking out yellow beans, which are often mixed with the green "Refugees," must also remove beans of the improper grade. The pea and bean sorting tables are usually located close to the graders, and from the graders the vegetables pass directly onto the tables. Pea graders are constructed of horizontal metal planes with holes in them for the peas to fall through. In bean graders there are wire frames instead. These planes or frames are shaken by power, and the machines when operated produce a continuous roar. The result is that it is often impossible to carry on a conversation where the women sorters work. Of the pea and bean sorters, 212 (or 49 per cent) worked where noise was graded "A" or "B"; 339 (or 61 per cent) where it was graded "C" or "D." Two-thirds of the women bean sorters worked where the noise was excessive. Sometimes the sorting tables are located near the washers or blanchers, with the result that the floors where the sorters work are wet. Efficient management on the part of the factory owner in the arrangement and operation of his factory would usually prevent this.

Sorting is only partly "machine-paced." The women are supposed to pick over the products passed before them, and if they are conscientious, or if they are closely under the supervision of a forewoman or superintendent, they will keep pace with the machine. The writer has seen women, when the conveyor has carried the beans past faster than they could be handled properly, frantically push them back in the hope that the stream would soon slacken up. On the other hand, it must be said that if the

employer tries to drive the machinery too fast, the quality of the pack will suffer, for the women will not attempt to sort cleanly. As an offset to the speeding is the fact that in many of the smaller factories slack moments, due to breakdowns in machinery and changing of grades of beans on the tables, are frequent.

Another feature of this work which is trying on the workers is that the steady ever-moving stream of peas and beans often produces nausea, very much akin to seasickness, so much so that some women are unable to do the work. The eye-strain, especially in picking out the small foreign particles from the peas, is considerable.

The following reports are from women investigators who worked at "sorting:"

"Sadie H—— said she had a bad headache since yesterday. The bean tables are narrower than the pea tables and move faster. The noise of the machinery is so loud as to practically preclude conversation. When it stopped yesterday afternoon I felt a curious sensation of deafness in the ears, but it passed away at once."

"Mrs. P—— told me at lunch time that she had a very sick headache. Working at bean tables always makes her ill."

"Towards the close of the afternoon Dolly R——, who sorted peas, complained of a headache. She said she had worn thin slippers and gotten her feet wet. She hopes that she can work inside at weighing beans, as working at the tables makes her ill."

"I went to work at 7 o'clock this morning (Sunday). I worked several hours at sorting peas and then became so dreadfully sick that I had to leave the factory. This work is simple enough and does not require great physical effort, but the factory was so insufferably hot, damp and smelly that I became sick in a very few hours. The floors are concrete and are covered with water; the room is hot and full of steam, the noise of machinery is deafening, and the combination was more than I could stand. An American girl working in the warehouse told me she too had been working at the sorting table on Saturday and that she could not stand it. The other two American women said that they worked at the sorting table last year and it made them dizzy and sick."

"The work of sorting is very hard on the eyes; all the women complain of this. One said that when she got home at night she took up the paper and tried to read, but 'the print kept flying by just like the peas.' The light is very good, however, and the electric lights are quite adequate. After 11 hours of work the eyes of all the women looked very tired."

"The bean tables are right under the combination grader and sorter and the noise is terrific — simply ear-splitting. My ears are still ringing. Combined with the jiggling of the grader the work is most unpleasant. It makes one quite seasick, though sorting beans is not so monotonous and trying on the eyes as work on peas."

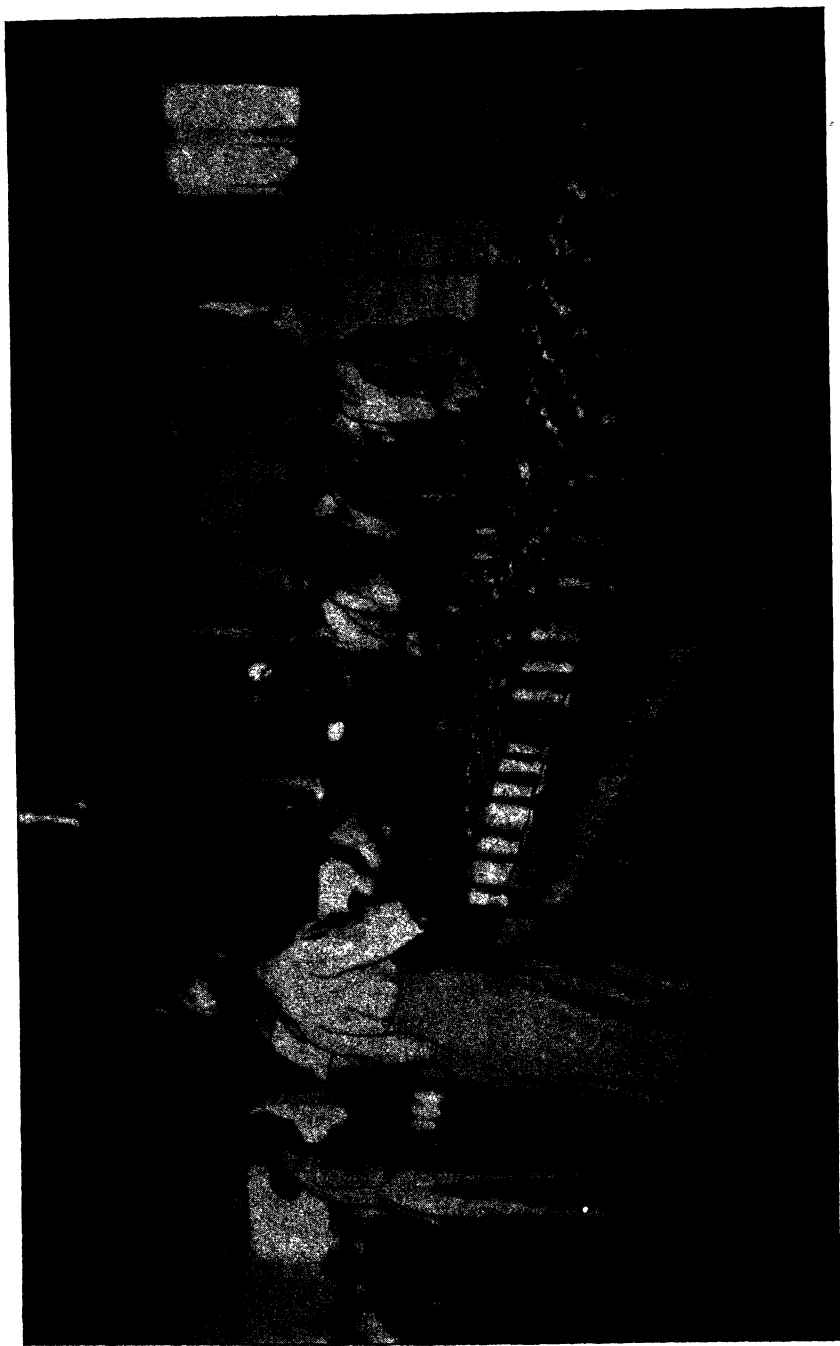
"Mrs. McA—— worked on the bean sorter this morning. It made her sick to her stomach (very!) and she could not work on it this afternoon. It gives one the same sensation as seasickness with the graders going up and down and the beans moving forward on the tables."

FEEDING CORN CUTTERS.

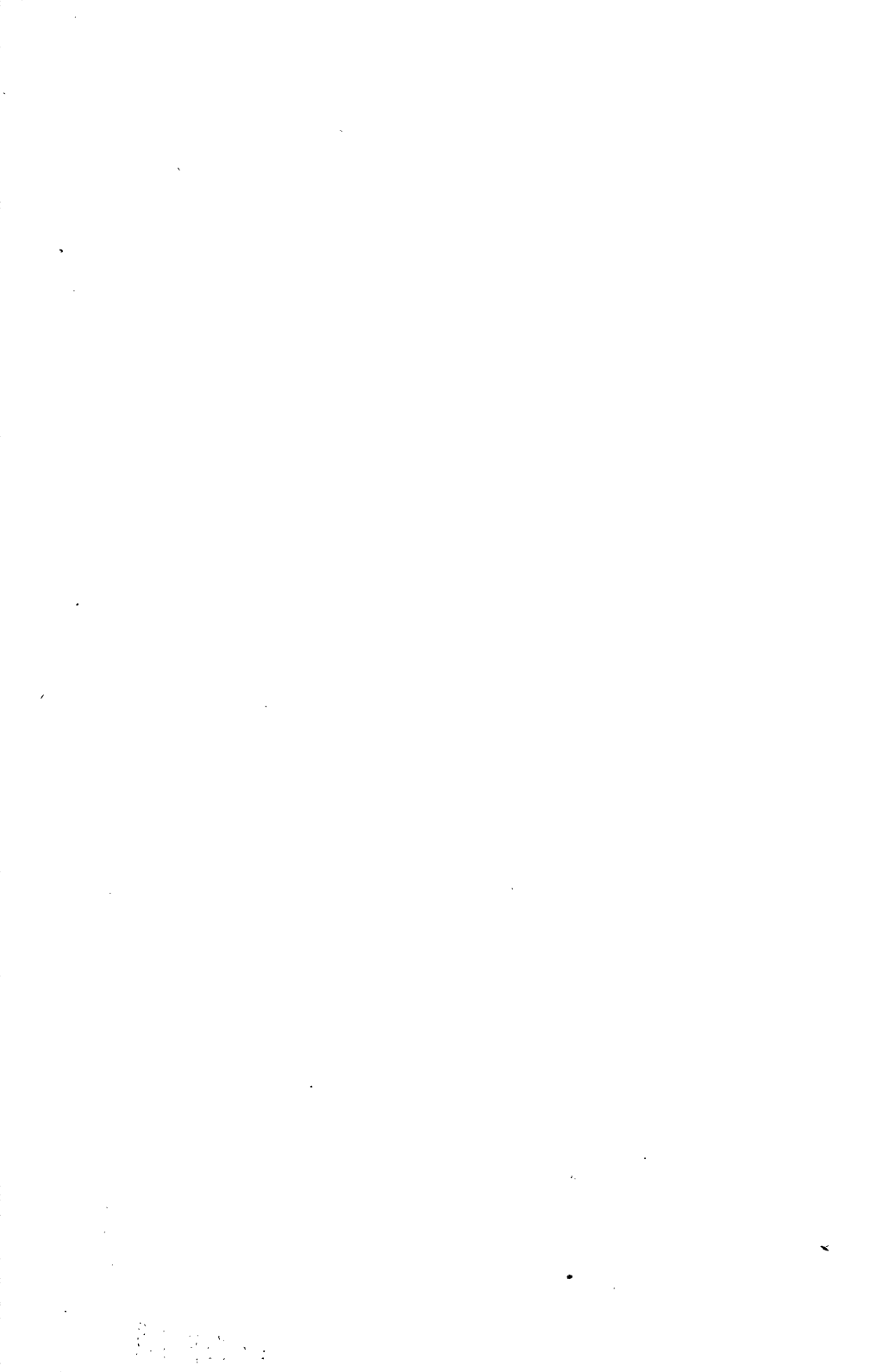
Corn after being husked is sorted, sometimes on conveyors, sometimes on stationary tables. This work is not so taxing as the sorting of peas and beans. Then the corn passes to what are known as corn cutting machines. Into these machines the ears are fed, usually by women. From it come the kernels of corn which pass on to a cleaner that removes the silk and other foreign particles. The task of feeding the cutters is not pleasant. Almost without exception the workers stand, and the sticky milk of the corn spatters over them. The accident reports of the Labor Department show that several fingers are lost in the canneries every year. Undoubtedly most of these are caught in the corn cutters, since the hands of the operators come near the knives of the cutters and are likely to be drawn in, especially if a piece of cob gets lodged in the entrance to the knives and an attempt is made to remove it with the fingers. One large factory uses men only on the corn cutters, setting an example worthy of imitation.

FILLING AND WEIGHING.

The next process through which the products pass is that of filling and weighing. The cans are required by law to equal a certain weight. Those for peas and corn are usually filled by



THESE GIRLS ARE FILLING AND WEIGHING THE CANS. NO SEATS PROVIDED.



machinery. Berries are sorted directly into the cans. Beans are put into cans partly by machinery, but need to be balanced to the proper weight. Cherries, tomatoes, pears, etc., are placed in the cans by hand.

This work of filling and weighing is usually paid for by the piece; consequently it is done at a high rate of speed. The products worked on are often steaming, and the air is filled with vapor. Workers at this task usually stand, no seats being provided.(3) It is recognized as one of the most difficult tasks in the factory, and consequently is often paid for at a higher rate than other work. Workers often get their fingers cut on the sides of the cans, and the acids, especially in tomato filling, irritate the sores. Here are reports of "working investigators" regarding this work:

"Lizzie J—— complained in the morning that she did not feel at all well so I was not surprised when she did not return in the afternoon. Her place was taken for a few minutes by a young girl called Emma, who is working at filling cans with peas. She said it was hard because they have to stand all the time."

"Mr. J—— said I could probably fix it up to get a job filling cans. The only trouble was that it is very hard on the hands as the can sometimes cuts the fingers and they always have to be protected."

"Mrs. B—— said she felt very tired this noon. The women who work at the weighing tables stand all the time. She said she was almost tempted to 'throw the damned thing up.'"

"ON THE LINE."

After the cans have been filled they are passed on to the "capping line"—a series of machines which fill the cans with syrup, stamp them to show the variety and grade, and seal them. Women are largely employed in four of the operations connected with this process.

The machine used for filling peas and corn often begins "the line." Into it the cans are fed by a chute leading generally from the second floor. Here a woman—in some factories two women or a boy—is employed feeding the cans into the chute. The rate

(3) At one plant seats were provided for the women "fillers" for the first time the day of the Commission's visit to the factory.

of work is determined absolutely by the speed of the machinery, which demands very rapid work when only one woman is employed. A machine has been invented which automatically rights the cans at the "filler" and where installed, greatly relieves the tension of the work, for the cans need not be placed in the chute right side up as is otherwise the case. This machine, however, is not as yet very extensively used.

Women are also employed for putting caps on the cans. The cans go over "the line" at the rate of from 40 to 110 per minute. The capping machine in most general use has a capacity of about 72 cans per minute, but is not often run at that rate. As the cans go by the woman must place a small tin cap on each can. The speed is regulated absolutely by the machinery, and often the women work at high tension. Twenty-two factories used only one woman on a "line;" 35 factories used two. A machine has been invented which automatically places the caps on the cans and the operator has only to feed them into it, which greatly relieves the strain. Only a few factories have at present installed this machine, as it is only a recent invention.

The women who put on caps always work close to a row of twelve red hot soldering irons, and often the heat is excessive. Very common, too, the floors where these women work are wet.

Here are reports from "working investigators" regarding this capping machine work:

"Lizzie J—— who works most of the time at the capping machine was transferred to the sorting tables and I sat next to her. She told me that a man had invented a machine to put on caps, so now there is only one girl who puts them on by hand. She said it was 'frightfully hot work.'"

"A girl who works at the capping machine said that she found it 'very hot.'"

Sixteen factories employ women for "inspecting." Unless the cans are perfectly sealed the contents spoil. The capping machine does its work remarkably well, but a considerable number of cans come through with slight defects. The "inspector" sits by "the line" and as the cans go by examines each one. The eye strain of the work is intense. One feature which these inspectors share with the women who put on the caps is the heat, each task being

located about equal distances from the hot soldering irons. Floors where the inspectors work are likewise often wet.

At many factories women are employed to make syrup or brine to supply the "syruper." This is usually done on the second floor, apart from the machinery, and after making one vat full of brine the worker has a period of rest. The work requires lifting and carrying of measures of sugar and salt.

The speed of the tasks "on the line," as has been said, is determined by the speed of the machinery, and often the women work at high tension. This is partly offset by the fact that there are frequent interruptions in the work, due to the changing of the grade of the product which is being run. In the larger canneries these interruptions are not so frequent, due to the fact that one line is devoted exclusively to one grade of goods. Even here, however, there are a considerable number of interruptions due to breaks in machinery and other causes which partially relieve the high pressure of work.

PACKING CANS IN CASES.

From the capping lines the cans are put in large iron crates in which they are immersed in great vats and cooked. Then they are cooled in tanks of water and taken to the storehouse and packed in cases. Sometimes women do this work. One "working investigator" describes this process as follows:

"Ten hours in the warehouse to-day. All the women complained of being very tired before our work was over. They kept us more steadily at the packing of boxes, the pauses being less frequent and of shorter duration—about two minutes' pause every half hour or so. We work very fast and stoop constantly to get the cans out of the crates. I have aches and pains all over, and the other women complain of pains in their arms. The foreman told us that if the superintendent came and saw us resting even for a minute, he would send some of the women away to the factory and make it so much harder for the rest."

Another report from a "working investigator" is as follows:

"Mrs. M—— says that packing is hard because there are no stools and the workers have to bend over constantly when packing cans into the cases."

LABELING.

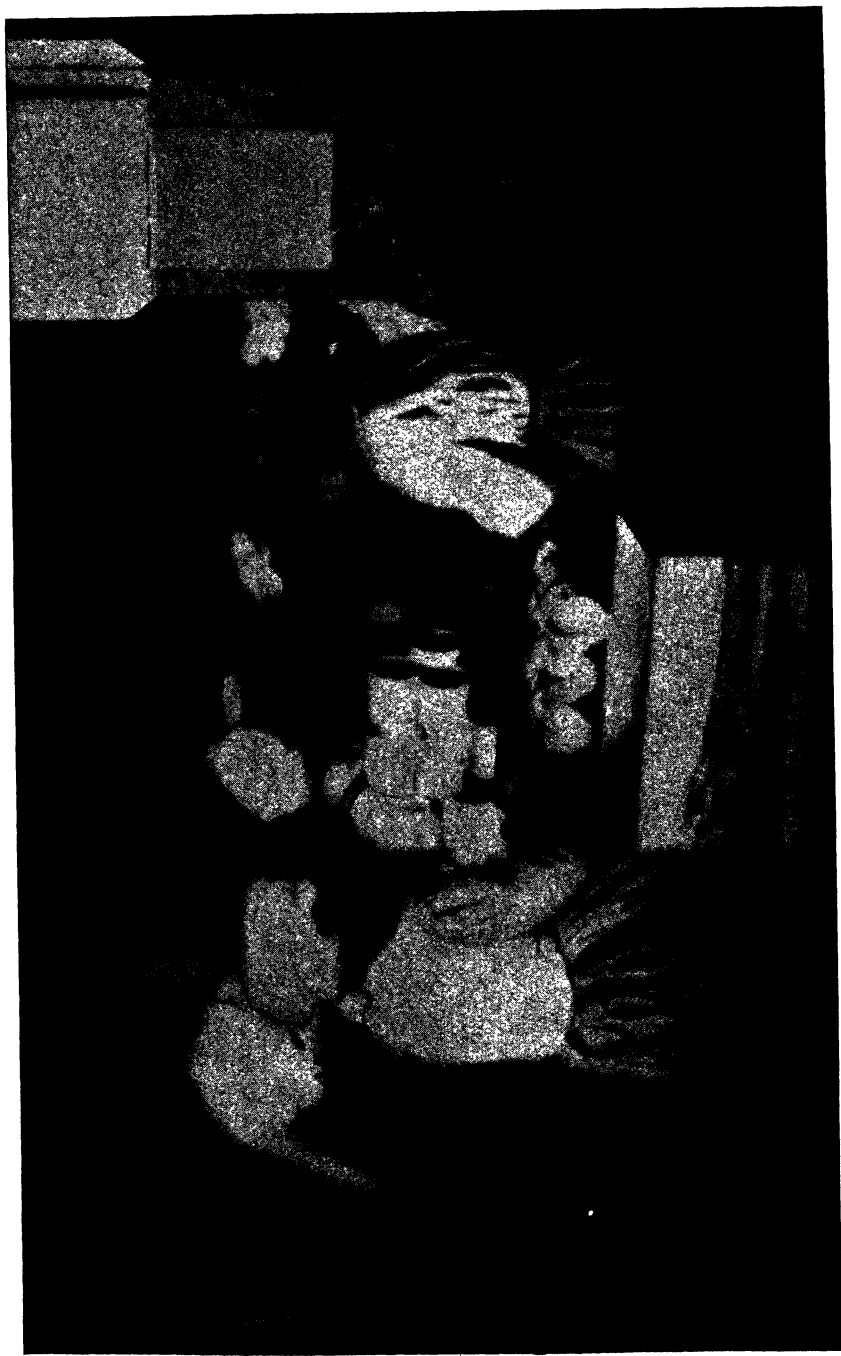
Before being shipped the cans are labeled, and some of the fancier products are wrapped in tissue paper. This work is carried on in the storehouse, usually, though not always apart from the noise and strain of most of the machinery. Sometimes the labeling is done by hand; sometimes by a hand operated machine and sometimes by one driven by power. Hand labeling is usually paid by the piece, so there is incentive to rapid work. Machine labeling is usually done at a high rate of speed. Following is a description of this work at one factory:

“Work on labeling machine keeps me at pretty high tension. I kept track of the speed of cans through the machine this afternoon. This is the speed per minute, on ten different minutes, at which cans passed in front of the label inspector: 140, 141, 150, 112, 160, 20, 100, 148, 100, 140. She must take out any unlabeled can or one with a flaw. It keeps one busy and is trying on the eyes. One also uses the sense of feeling by keeping the hand running over the cans. The gilt of the can labels comes off on the hand and makes it smart.

“To be fair in judging this high speed one must consider the fact that every now and then there is a stop of five or ten minutes when there is trouble with the machine, or a new set of labels to be put in. When there are small orders there are stops very frequently, but when there are big orders of five hundred or more cases the high rate of speed continues for quite a while. Also one must consider that there are two girls on each machine, one inspecting and one repairing, and when one girl cannot stand the inspecting longer, the other can shift into her place. The noise is terrific, worse than the pea sorting tables, almost as bad as the bean tables. The clap of the cans going into the machine, which sounds exactly like the capping machines, the roll of the trucks, the pounding of the machine which nails on the case covers, the bang and clatter of the cases as the men thump them onto the carriers tires one extremely.”

Again the investigator reported:

“This afternoon we packed from our label machine 1,100 cases. Since I worked on the machine all the afternoon I inspected 24,000 cans or 80 per minute. This was steady work, for the orders were large.”



ITALIAN WOMEN LABELING.

1955



From the labeling machine the goods were packed back into cases ready for shipment and the consumer.

Clearly the work of women in canning factories is distinctly factory work and subjects them to hardships which must be taken into consideration in judging the strain which they endure when the hours are excessively long.

CHAPTER IV

HOURS OF LABOR OF WOMEN.

The hours of labor for women in some of the canneries are excessively long. The longest hours per week discovered were $119\frac{3}{4}$, worked by a woman in one factory during the pea season of 1912; and the longest hours per day discovered were $21\frac{1}{2}$, worked by a woman in another factory during the cherry and berry season of 1911. These are extreme cases, but it is an indisputable fact that many canneries during their rush periods work women excessive hours.

Our information regarding the hours of labor is based on complete transcripts for two years, 1910 and 1911, of official records of 70 different canneries. If our statements are inaccurate it is because the canners' records are inaccurate. The following tables show the longest hours of labor per day and per week recorded in the canneries in 1911:

Hours Worked Longest Day.

- 13 canneries worked women 12 hours or less.
- 20 canneries worked women 12 to 14 hours.
- 19 canneries worked women 15 to 17 hours.
- 13 canneries worked women 18 hours or more.

Hours Worked Longest Week.

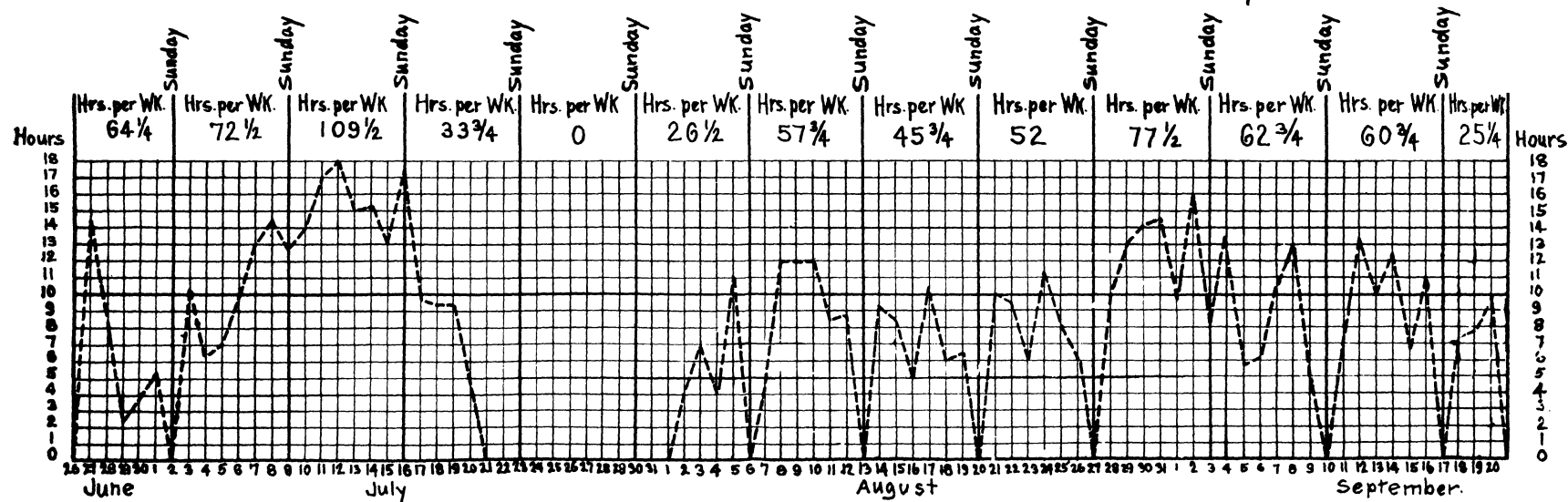
- 15 canneries worked women under 60 hours.
- 8 canneries worked women 61 to 66 hours.
- 6 canneries worked women 67 to 72 hours.
- 10 canneries worked women 73 to 79 hours.
- 11 canneries worked women 80 to 89 hours.
- 7 canneries worked women 90 to 99 hours.
- 3 canneries worked women over 100 hours.

Charts, Nos. III to XV, show the hours worked during the season by individual women who worked the longest hours in the factories where they were employed. While these charts represent for different factories the hours of women who worked the longest, there are in every case other women who worked approximately the same hours.

HOURS of LABOR of EMPLOYEE No.13. The Woman Who Worked Most Overtime at Factory No.101.

CHART. III.

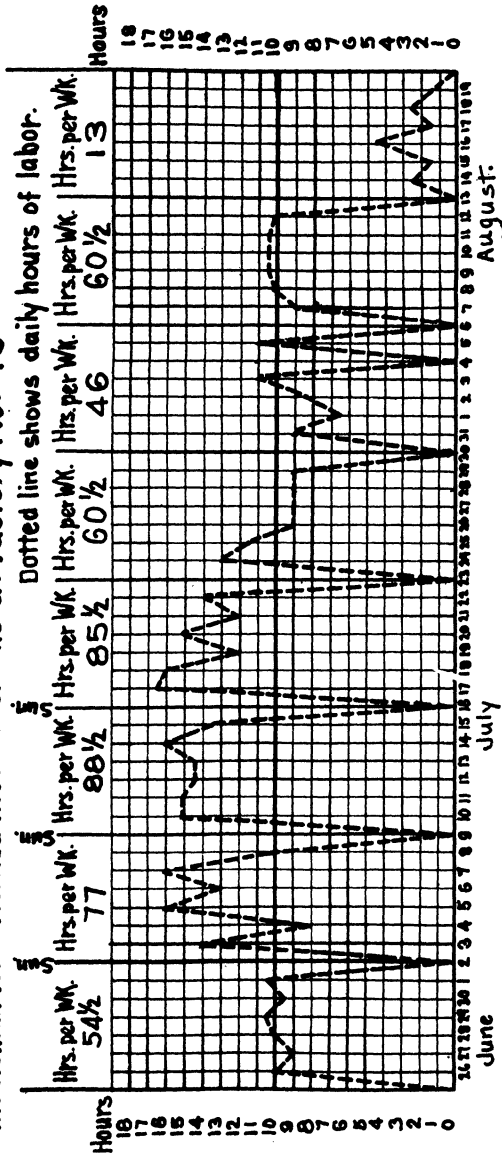
Dotted line shows daily hours of labor



HOURS of LABOR of EMPLOYEE NO. 1.

CHART IV.

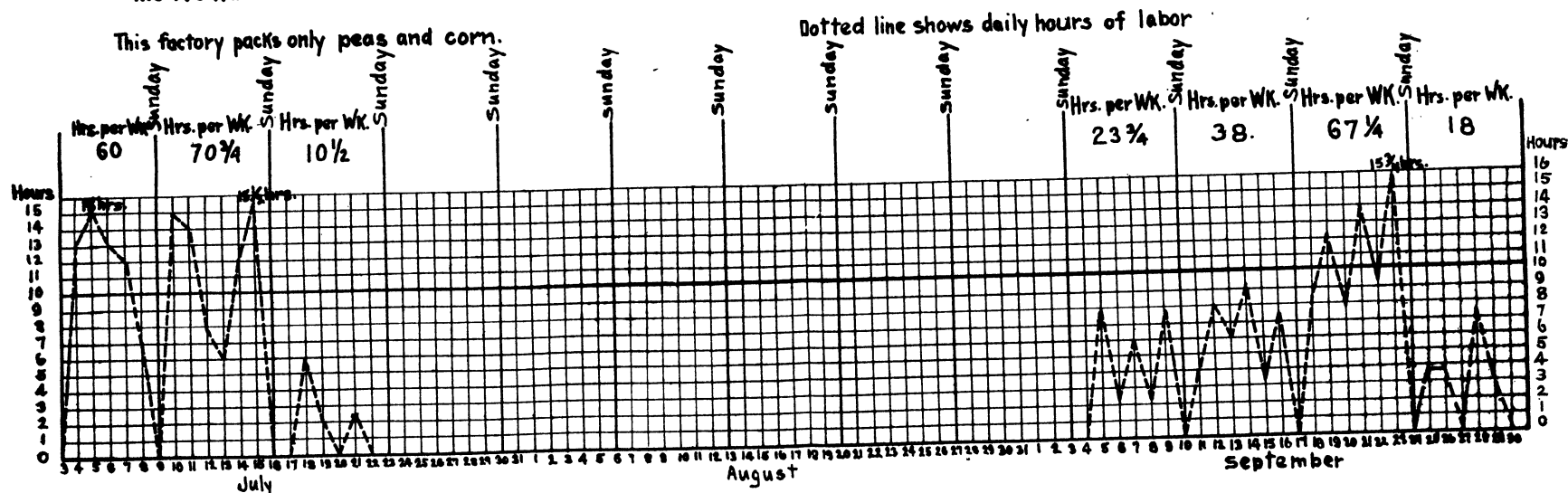
The Woman Who Worked Most Overtime at Factory No. 40.



HOURS of LABOR of EMPLOYEE No 1.

The Woman Who Worked Most Overtime at Factory No. 79.

CHART V.



Again, figures and charts need to be interpreted in terms of flesh and blood. What do these hours mean to the women who work them? The following passages from the diaries of investigators who worked in the factories serve to give the answer:

"To-day Mrs. M—— left at noon to go home and come back at night. The first time she has missed out. Told me she was so tired she had to go home to bed."

"At nine o'clock last night Nellie —— complained she 'got tired sitting as well as standing.'"

"Another worker at our table is Miss R——, a beautifully built young woman of twenty-four. This morning at 8 she complained of 'aching everywhere' she was so tired."

"I worked till 11.45 last night with the rest. To-day the heat was intense. Scalding liquid from the par-boiling is poured out at one end of the factory about 12 feet from the sorting tables. This condition, added to fatigue, made awful inroads on the workers. Big strong young men sat down with head in hands, waiting for the next job."

"Preston T——, son of my landlady, worked late last night. He takes malt tonic before his meals. He is so worn out his mother begged him not to go to the factory to-night but he couldn't get a substitute."

"Mrs. T—— said yesterday, 'This sleepy feeling is more like pain than anything else.'"

"Mrs. McG—— said that in 1910 after a spell of night work, several nights till midnight, the women were so exhausted they couldn't do anything more one night, and a whole batch of peas had to be thrown out."

"Coming home at 9.30 Friday night Mrs. B—— complained that her knees were shaky and she felt as if she would fall together any moment. Her eyes ached and were red from the strain."

"'I'm all in. I don't know what I'll do if they work us like this for another week.' Irma B——, aged about 20, made this statement twice to-day"

"'It's hope keeps us up,' says Mrs. M——, 'hope it will soon end, and hope of a little extra money.'"

"Many of the women complained of feeling very tired and sleepy this morning after the long hours last night. Emma C—— said she had been unable to sleep."

"My place was under an electric light and a portly matron next said: 'Your eyes are better than mine, so you might change places.' This I did. She complained of being tired and sleepy and a younger woman next her said she was 'all in.'"

It should be noted that the investigators who made the above reports in no case worked in the factories where women worked over 80 hours a week. Of the fatigue of the women who worked 90 or 100 hours in a week, we have no description.

HOME WORK.

Nor are the women through with work when they leave the cannery. Many of them are housekeepers, and have cooking, sweeping, bed-making, sewing, and washing to do, and often children to care for before and after hours in the canneries. Out of 941 women, 671, or 71 per cent, did housework before or after their factory work. These cares must be added to the wear of factory life in measuring the strain under which these women live.

Moreover, when the factory hours are long, the house work often suffers.

Mrs. McG—— said to one "working investigator:" "If we have a free Sunday. I'm going to cook and eat all day long. I'm so starved for something cooked."

Another report is:

"Mrs. —— told me she was so tired and exhausted from lack of sleep she had to go home and go to bed. She commented on lack of hot meal for herself and daughter since work began, which lack she thought added to her fatigued condition."

WORK IN OTHER FACTORIES IN DAY TIME.

Some canneries employ women at night who work in other factories or at other regular work during the day. "Working investigators" reported:

"Three girls from the knitting mill worked at the factory last night. There were five others who had not been there during

Oversized Foldout

the day, but I could not easily get any one to tell me whether or not they worked in the knitting mill too."

"Eva B——, knitting mill girl, has come regularly each night. She worked from 1 to 6 P. M. Saturday (half holiday at mill) and again from 7 to 12 at night. She told me she earned \$2.78 week before last in the cannery, 27¾ hours, besides her mill work."

"The first woman I met on Saturday, Mrs. McG——, who was also applying for a job, is a laundry worker by day and has a husband who works in the factory. She wanted a job sorting peas at night to increase their income still more. She told me she had fainted in the laundry on Saturday and the pea sorting in the evening made her feel ill. She wanted me to ask the Superintendent if she could come and just work till 11 or 12 at night, but he said that wouldn't do as he had to have girls he could depend on."

"Mrs. G—— fills cans at the table and is said to be altogether the fastest worker in the factory. She stands all day and does not seem to mind it. Besides working at the factory, she takes in washing. We are to begin at seven Monday morning, and she said it would be hard because she has four washings to do. Her husband is addicted to drink."

A careful examination of the charts showing the hours of labor of women reveals certain facts:

1. That the length of the canning season varies from factory to factory.

2. That while the women work extreme hours at certain times during the season there are alternative periods of rush when, the hours are long, and let-down when they are short or when the factory is closed down altogether.

THE CANNERY SEASON.

The length of the season varies from cannery to cannery, according to the goods packed. Roughly speaking, berries are canned in June, peas in July, beans in August and September, corn in September and October, apples and pumpkins in November. Some factories pack only one product. There are, for instance, many small establishments which pack only corn, and three which

pack only peas. For these factories the season is of only a few weeks' duration. Two factories pack only peas and corn. Work is carried on in them a few weeks in the spring and early summer, and again a few weeks in the fall. Most factories, however, pack a larger number of products, and a few put up pork and beans or plum pudding, so that work in them lasts practically all the year round.(1)

The following table shows the length of the 1911 season in representative factories according to the crops packed:

TABLE NO. X.

LENGTH OF SEASON ACCORDING TO PRODUCTS CANNED AT REPRESENTATIVE FACTORIES.

| FIRST AND LAST PRODUCTS PACKED. | First day of work. | Last day of work. | Days from beginning to end of season. |
|---|--------------------|-------------------|---------------------------------------|
| 1st. Factory starting on strawberries and ending on apples..... | June 8 | Nov. 9 | 155 |
| 2nd. Factory starting on strawberries and ending on apples..... | June 13 | Dec. 18 | 189 |
| 3rd. Factory starting on strawberries and ending on pumpkins..... | June 17 | Nov. 10 | 147 |
| 4th. Factory starting on strawberries and ending on pumpkins..... | June 27 | Nov. 26 | 153 |
| 5th. Factory starting on cherries and ending on apples.. | July 1 | Nov. 25 | 148 |
| 6th. Factory starting on cherries and ending on apples.. | June 20 | Oct. 27 | 130 |
| 7th. Factory canning peas only..... | July 2 | Aug. 3 | 33 |
| 8th. Factory canning peas only..... | June 26 | Aug. 2 | 38 |
| 9th. Factory starting on peas and ending on corn..... | June 20 | Oct. 3 | 106 |
| 10th. Factory starting on peas and ending on corn..... | July 17 | Oct. 17 | 93 |
| 11th. Factory starting on peas and ending on pumpkins.. | July 2 | Nov. 25 | 147 |
| 12th. Factory starting on peas and ending on pumpkins.. | June 29 | Oct. 12 | 106 |
| 13th. Factory canning corn only..... | Sept. 2 | Oct. 3 | 32 |
| 14th. Factory starting on corn and ending on pumpkins.. | Sept 6 | Nov. 25 | 80 |

The length of the period of each crop varies from year to year and from factory to factory. Some years, for instance, the weather will be cold during the period when peas are ripening, and they will be spread over five or six weeks; in other years warm weather will bring in the crop more quickly and the season will be shorter. Weather conditions in certain parts of the canning region make crops last longer than in others. The duration of each crop depends also upon the varieties packed. If a canner packs only early peas, his pea season would not last as long as if he packed both the early and late varieties.

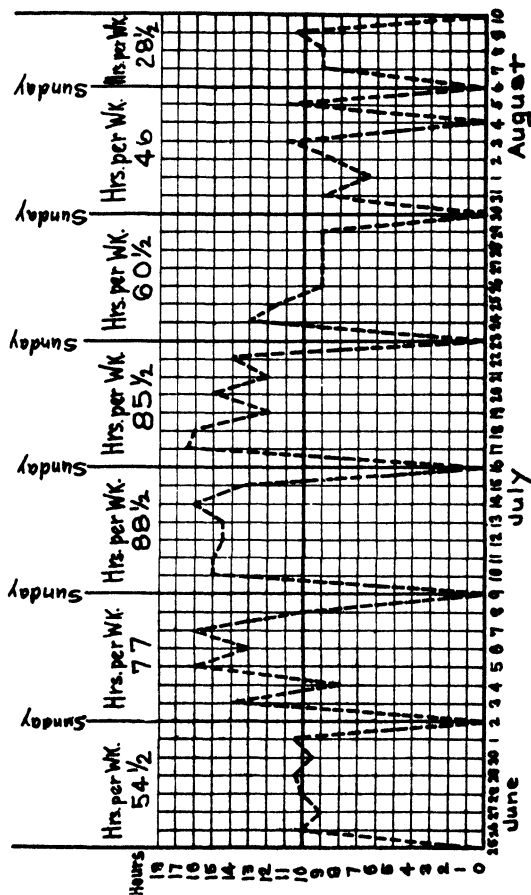
The methods of planting, cultivating and harvesting crops have much to do with determining the number of days the crops will

(1) For a list of the canneries of the State and the products they pack see Appendix, Table 1.

HOURS of LABOR of EMPLOYEE No.1.

The Woman Who Worked the Most Overtime at Factory No.40.

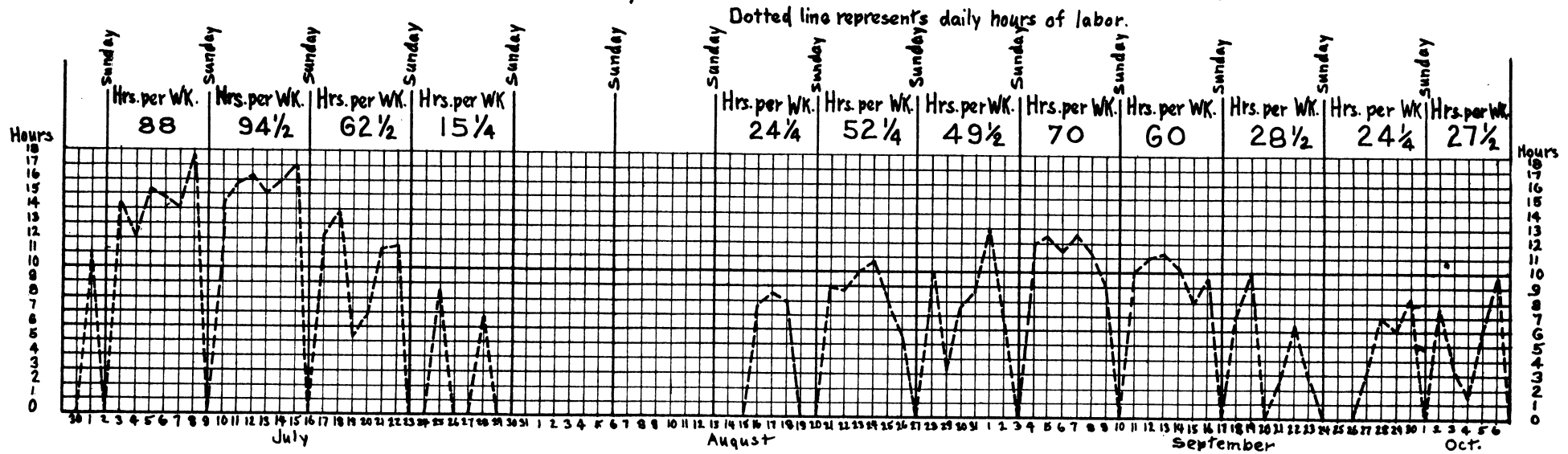
Dotted Line Shows Hours of Labor:



HOURS of LABOR of EMPLOYEE NO.11.

The Woman Who Worked Most Overtime at Factory No.125.

CHART IX.



last. If a canner planted all his beans on a single day (which is, of course, never the case) he might expect them to mature on a certain day. If the planting is spread out over a number of days, the plantings will not mature all together. Where the canner does his utmost to spread his plantings over many days or weeks the duration of the crop will necessarily be longer than if such pains are not taken.

A canner who puts up a large pack of any crop, drawing his products from an extended area and many different plots of ground, will have a longer season than a canner who puts up a small pack drawn from a restricted area, since varying conditions on widely separated farms lead to early and late ripening. The duration of the period during which some of the leading products were packed in 1911 were as follows:

TABLE NO. XI.
DURATION OF PERIOD IN WHICH LEADING CROPS WERE CANNED AT DIFFERENT FACTORIES, 1911.

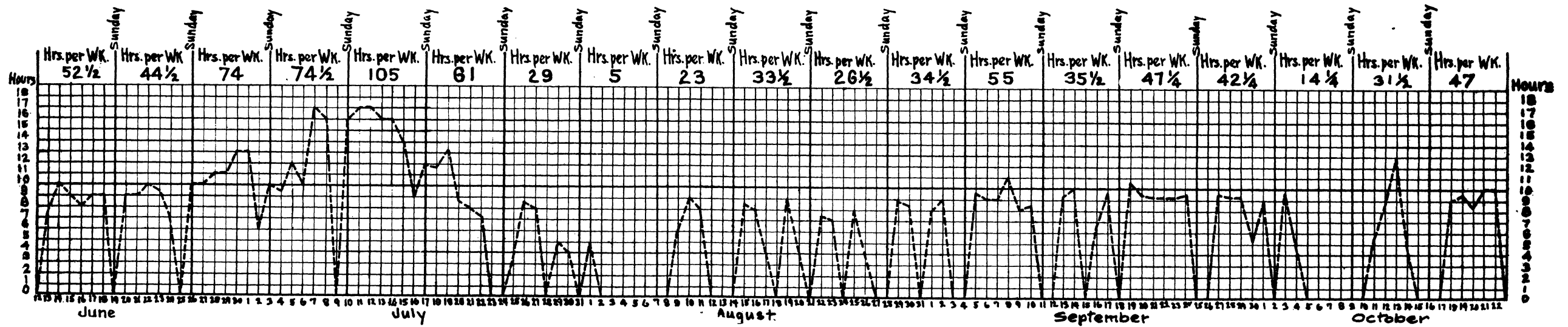
| PRODUCT. | 1 to 9
days. | 10 to 19
days. | 20 to 29
days. | 30 to 39
days. | 40 to 49
days. | 50 to 59
days. | 60 to 69
days. | 70 to 79
days. | Over 80
days. |
|-------------------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|
| Strawberries..... | 1 factory | 10 factories | 10 factories | 7 factories | 1 factory | 1 factory | 1 factory | 1 factory | 1 factory |
| Raspberries..... | 2 factories | 2 factories | 9 factories | 1 factory | 2 factories | 1 factory | 1 factory | 1 factory | 1 factory |
| Blackberries..... | 2 factories | 5 factories | 5 factories | 7 factories | 1 factory | 1 factory | 1 factory | 1 factory | 1 factory |
| Cherries..... | 2 factories | 2 factories | 11 factories | 6 factories | 1 factory | 2 factories | 2 factories | 2 factories | 1 factory |
| Plums..... | 2 factories | 4 factories | 4 factories | 19 factories | 12 factories | 4 factories | 5 factories | 4 factories | 1 factory |
| Peas..... | ..... | 3 factories | 111 factories | 10 factories | 3 factories | 7 factories | 4 factories | 1 factory | 1 factory |
| Beans..... | ..... | 4 factories | 11 factories | 20 factories | 7 factories | 8 factories | 1 factory | 1 factory | 1 factory |
| Tomatoes..... | ..... | 4 factories | 1 factory | ..... | 13 factories | 1 factory | 1 factory | 1 factory | 1 factory |
| Corn..... | ..... | 1 factory | 4 factories | ..... | 4 factories | 3 factories | 1 factory | 1 factory | 1 factory |
| Peaches..... | 1 factory | 2 factories | 3 factories | 4 factories | 1 factory | 3 factories | 1 factory | 1 factory | 1 factory |
| Pears..... | 2 factories | 3 factories | 2 factories | 2 factories | ..... | 1 factory | 1 factory | 1 factory | 4 factories |
| Beets..... | ..... | ..... | ..... | 9 factories | 6 factories | 3 factories | 1 factory | 1 factory | 8 factories |
| Apples..... | ..... | 3 factories | 2 factories | ..... | ..... | ..... | ..... | ..... | ..... |

HOURS of LABOR of EMPLOYEE NO.5.

CHART XI.

The Woman Who Work Most Overtime at Factory No.124.

Dotted line shows daily hours of work.

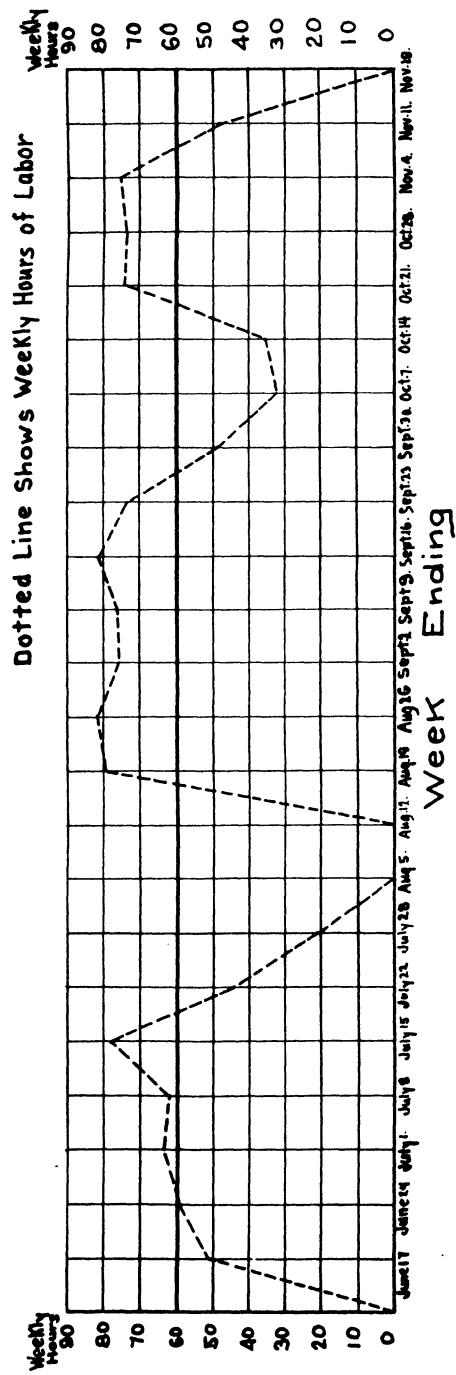


110710

WEEKLY HOURS of EMPLOYEE NO.17.

CHART XII.

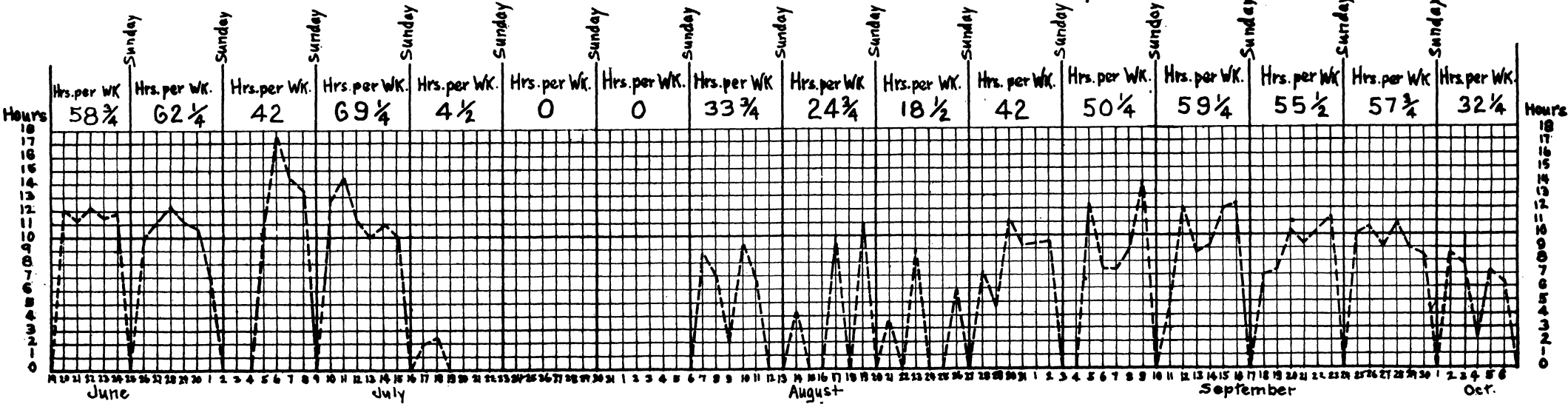
The Woman Who Worked Most Overtime at Factory No.11.



HOURS of LABOR of EMPLOYEE No.14.
The Woman Who Worked Most Overtime at Factory No.31.

CHART XIII.

Dotted line shows daily hours of labor.



Apples, pumpkins and squash are packed after the middle of October and are not quickly perishable. One canner in 1911 dumped his pumpkins and squash out on the ground. They began to rot, and to save them he worked women long hours. Such carelessness, however, deserves no protection. He had a shed and might have stored the products in it.

The period when perishable products are canned lasts approximately from June 15th, when berries begin, till October 15th, when corn ends.(2)

RUSH PERIODS.

Every crop comes on slowly. At first there are a few days when work in the canneries is light and the hours few. Soon, however, the products begin to come in more rapidly, and nearly always the hours steadily grow until they reach a peak, as appears in the diagram. Then the hours recede again until at the end of the crop there are again a few scattered days of work. If every crop were taken separately, the diagram of the hours would have the appearance of a mountain rising out of the plains on one side and receding to the plains on the other. The contour of the mountains would be somewhat different for different crops. Peas would rise more quickly to a peak and recede again more rapidly than beans or corn. They ripen more quickly than other crops and deteriorate faster after harvesting.

Where more than one variety of a vegetable is canned there is often a peak for each variety with slight depressions between. Early and late peas, for example, often result in twin peaks with about a week of let-down between them. The following diagram shows the pea peak at one factory:

Beans, tomatoes and corn are not so subject to sudden ripening and not so perishable as peas; and their rush periods, while not so extreme as the rush on peas, are more sustained. The following diagram shows the corn peak at one factory:

The length of rush periods on different crops varies from year to year and from factory to factory. The following table shows the duration of the rush period on the three leading crops of 1911:

(2) Strawberries often ripen the second week in June. June 15th to October 15th is, however, the period fixed by the canners during which they want an exemption from the law restricting the hours of women.

TABLE NO. XII

LENGTH OF RUSH PERIODS ON PEAS, BEANS AND CORN AT REPRESENTATIVE CANNERIES IN 1911.

| PEAS. | | BEANS. | | CORN. | |
|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|
| Number of factories. | Days of Overtime. | Number of factories. | Days of overtime. | Number of factories. | Days of overtime. |
| 2 | No overtime. | 1 | No overtime. | 1 | No overtime. |
| 5 | 5 days or less. | 8 | 5 days or less. | 3 | 5 days or less. |
| 11 | 6 to 10 days. | 6 | 6 to 10 days. | 6 | 6 to 10 days. |
| 8 | 11 to 15 " | 6 | 11 to 15 " | 6 | 11 to 15 " |
| 3 | 16 to 20 " | 2 | 16 to 20 " | 4 | 16 to 20 " |
| 7 | 21 to 25 " | 4 | 21 to 25 " | 4 | 21 to 25 " |
| 1 | 26 to 30 " | 1 | 26 to 30 " | 1 | 26 to 30 " |
| 1 | 31 to 35 " | 1 | 31 to 35 " | 1 | 36 to 40 " |

Between peas and beans there is generally a marked let-down, unless other crops intervene, when the factory operates but a few hours per day, or sometimes is shut down entirely. Not often is there a lapse between beans and corn. Generally the two crops run together so that there is sometimes an accentuated rush rather than a let-down.

The following table shows for 1911 whether the pea season overlapped the bean season and whether the bean season overlapped the corn season in representative factories:

TABLE NO. XIII.

SHOWING WHETHER PEA SEASON OVERLAPPED BEAN SEASON AND WHETHER BEAN SEASON OVERLAPPED CORN SEASON—1911.

| PEA SEASON OVERLAPPED BEAN SEASON. | | GAP BETWEEN PEA AND BEAN SEASONS. | | BEAN SEASON OVERLAPPED CORN SEASON. | | GAP BETWEEN BEAN AND CORN SEASONS. | |
|--|--------------|---|--------------|---|--------------|---|--------------|
| Number factories. | Number days. | Number factories. | Number days. | Number factories. | Number days. | Number factories. | Number days. |
| 3 | 1 to 9. | 5 | 1 to 9. | 5 | 1 to 9. | 4 | 1 to 9. |
| 3 | 10 to 19. | 10 | 10 to 19. | 10 | 10 to 19. | 1 | 12. |
| 4 | 20 to 29. | 6 | 20 to 29. | 6 | 20 to 29. | ..... | ..... |
| 1 | 30 to 39. | 1 | 37. | 1 | 37. | ..... | ..... |
| 11 factories, pea season overlapped bean season. | | 22 factories, gap between pea and bean seasons. | | 22 factories, bean season overlapped corn season. | | 5 factories, gap between bean and corn seasons. | |

At one factory beans started the day peas ended. Three factories started packing corn the same day they finished packing

CHART XIV.

**Hours of Labor of the Woman
Who Worked the Most Overtime
on Peas. Cannery 101.**

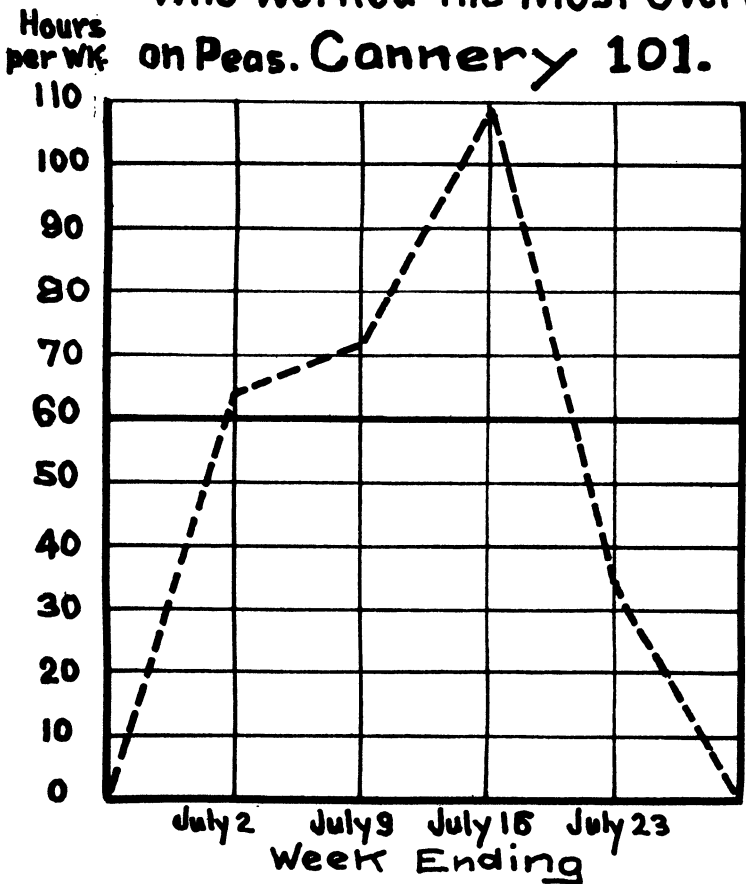
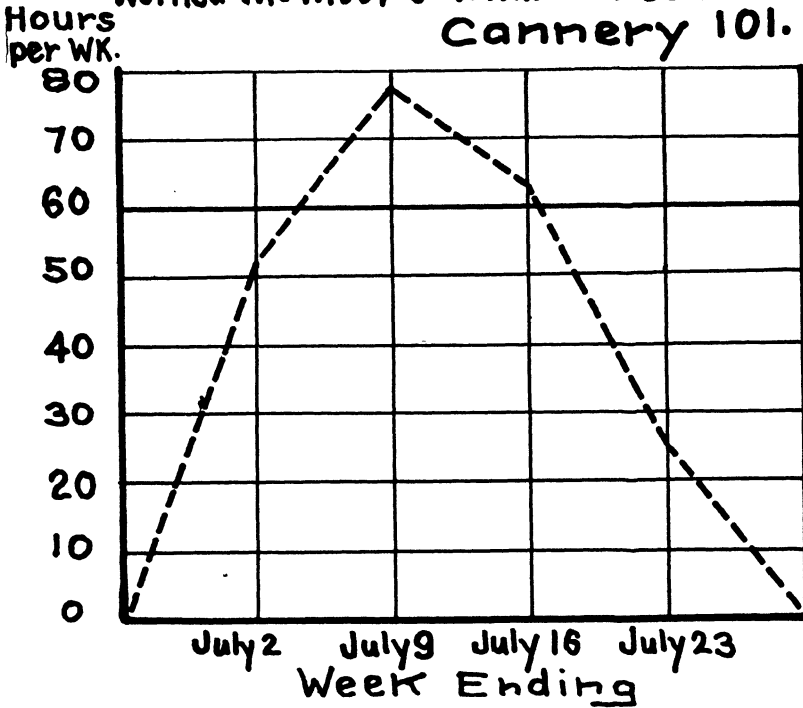


CHART XV.

Hours of Labor of the Woman Who
Worked the Most Overtime on Corn
Cannery 101.



beans. Where two crops ran together for a few days only there was often a let-down when the hours worked were few, even though the plant was not idle.

Tomatoes generally mature at about the same time as corn, and often these two crops, run together, cause an accentuated rush of work. For this reason some factories packing one crop do not pack the other, although both may be grown profitably in their territory.

The hours throughout the canning season at most factories are represented by a series of peaks, one for each crop. Very often two crops are packed together so that the peaks overlap. The larger the number of products packed, the more crops overlap, and the more the let-downs between peas, beans and corn are filled in with work on other products. Consequently the days and hours of work are most consecutive where many kinds of products are packed.

Two large factories in the State, one packing the largest number of different products canned in any New York State cannery, have been operated under a rule that women were not to work after 9 p. m. This rule has been strictly enforced, and as work has not started before 7 a. m., the hours of women have been limited to 12 per day and 72 per week. Occasionally products have remained at 9 p. m. which would spoil if let go till morning. In these cases most of the machinery has been shut down, and the men who have worked in the factory during the day have run through the remaining product. These men are paid more than half as much again as the women, so the pay roll has been larger than it would have been had women been worked overtime.

One of these factories puts up twenty-two different products, more than any other cannery in the State. Chart No. XVI gives the hours of the women who put in the most overtime at this plant.(3) It shows what the effect of limiting the hours of women to 12 per day and 72 per week has been in the factory packing the largest number of products.

It will be seen that even in this factory, where seemingly it would have been to the financial advantage of the owner to eliminate rush periods, were that possible, they have still existed.

(3) Many other women worked approximately these hours.

The second of the two plants never working women after 9 p. m. packs fifteen different products, more than the majority of the canneries. Chart No. XVII shows the hours of labor of the woman who had the most overtime at this factory:

Another large factory, among the first ten in the State in its pack of peas and beans, has endeavored to obey the law limiting the hours of women to 12 per day and 60 per week. In some cases it has exceeded those hours, but during the past two seasons has never worked a woman over 13 hours in a day and 67 hours in a week. This factory also has sent the women home when their hours were up, and, shutting down most of the machinery, has run through what product remained, using the men who work regularly in the factory.

Chart No. XVIII shows the hours of labor of the woman who worked longest in this factory.

It will be noted again that even where it would seemingly have been to the financial advantage of the canner to equalize the hours by preventing the rush periods, had he been able to do so, this has not been done.

Many of the canners, including those who work their employees long hours, suffer losses from time to time from spoiling of products which they are not able to handle even with overtime work. Clearly were they able to equalize the hours by preventing rushes and still turn out the same sized pack they now turn out, it would be to their selfish advantage to do so.

Rush periods when the crops come crowding in, and let-down periods between crops when there is little to do, seem to be characteristic of the canning industry. It is this fact — that the maximum hours the employees work are reached only on scattered weeks throughout the season while for most weeks the hours are less — which forms the basis for the canners' claim that their industry is different from all others.

AVERAGE HOURS.

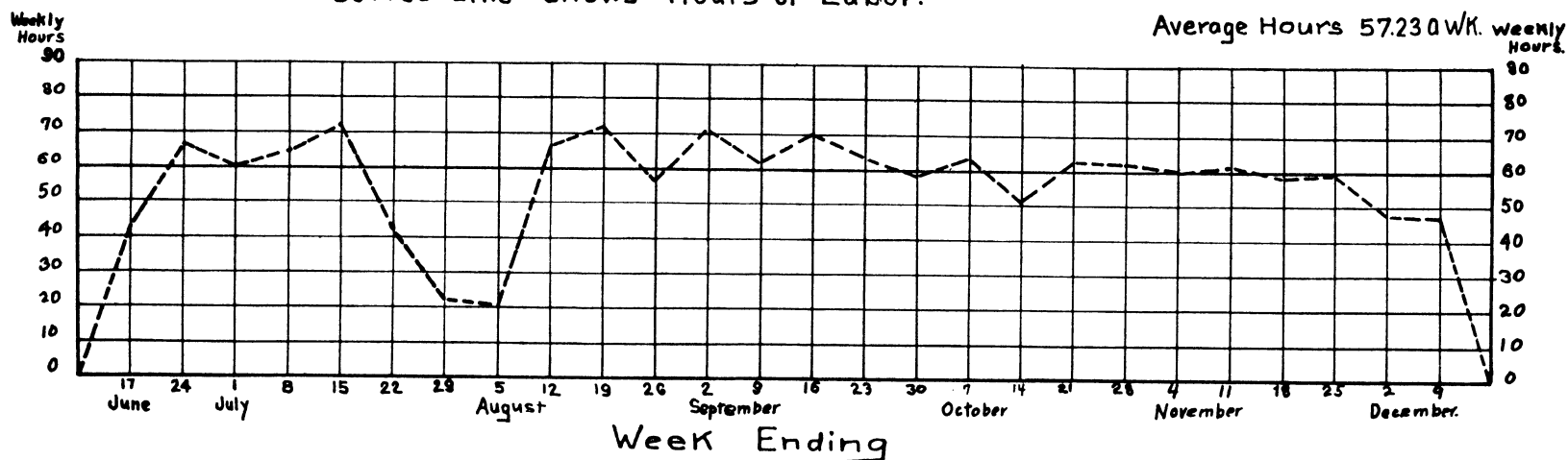
The claim of the canners as they have generally presented it has been that the average hours worked in their factories during the canning season have been less per day than the ten hours fixed by the law. They have contended — and it is true as the charts

WEEKLY HOURS of LABOR of EMPLOYEE No.30.

The Woman Who Worked the Most Overtime at Factory No.59.

CHART No XVI.

Dotted Line Shows Hours of Labor.

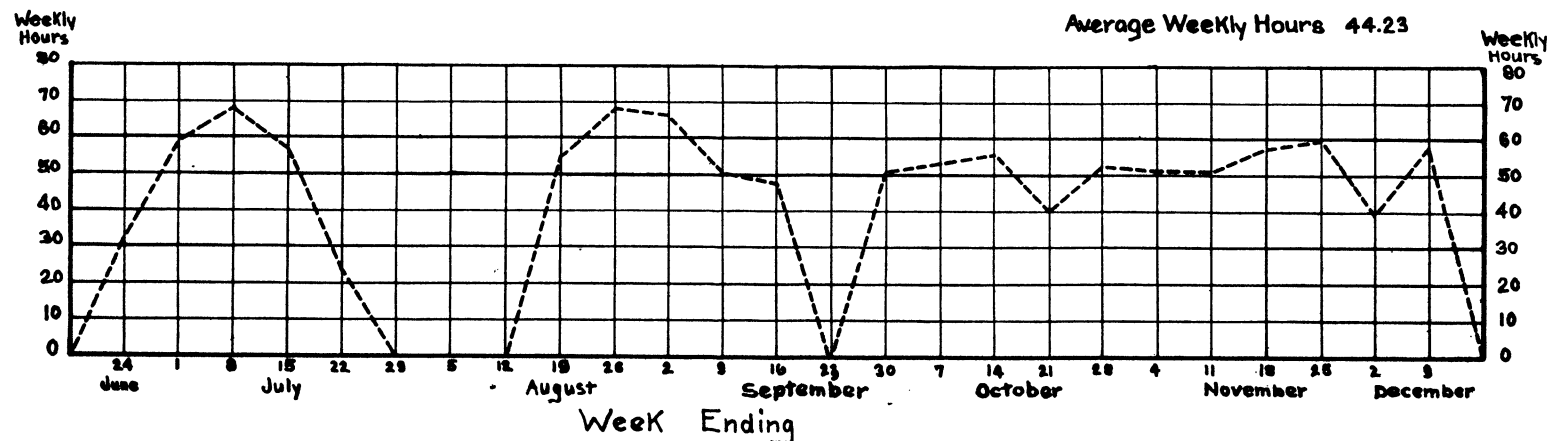


WEEKLY HOURS of LABOR of EMPLOYEE No.203.

The Woman Who Worked the Most Overtime at Factory No.60.

Chart XVII.

Dotted Line Shows Hours of Labor



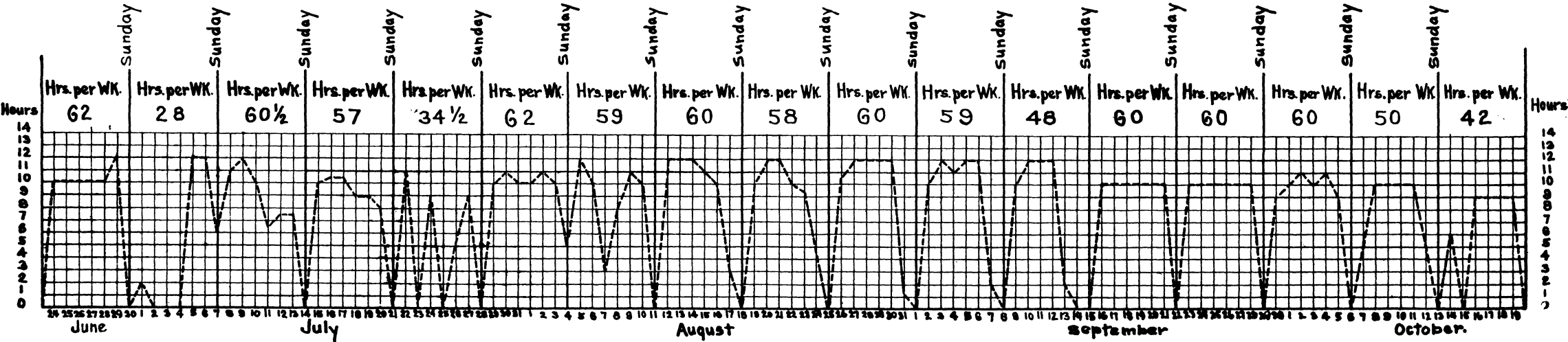
Hours of Labor of Employee No. 52.

The Woman Who Worked Most Overtime at Factory No. 29.

Dotted line shows daily hours of labor.

CHART XVIII.

Average Weekly Hours - 54.1



show — that the average hours between June 15th and October 15th, even of the women who work the longest generally, fall below ten per day. In 1910 the canners secured the introduction in the Legislature of a bill which, when amended by the Labor and Industries Committee of the Assembly, appeared in the following form:(4)

“The provisions of section 77 shall not apply to the employment of women and minors sixteen years of age and upwards for a season of not to exceed four months each year from June 15th to October 15th in establishments where fruits and vegetables are canned or preserved, provided that any such woman or minor shall not be employed in any such establishment for more than an average of ten hours a day during the said season.”

Aside from the fact that such a bill if enacted into law would be impossible to enforce, unless an inspector were kept in each factory every day from June 15th to October 15th, it would not prevent the working of women 20 hours a day or 120 hours a week. June 15th and October 15th are the outside dates fixed by the canners when perishable products are canned. Most factories start about July 1st or later; many stop before October 15th. Clearly, averages with fifteen days' leeway at the start or finish would mean nothing. A factory packing only peas or corn and operating but a few weeks could work women twenty-four hours a day, were that possible, and still the average hours from June 15th to October 15th would fall much below ten per day.

Few persons will claim that women can recover from the fatigue of working fifteen hours per day for a week by working five hours per day the week following. Averaging hours do not measure the strain on the worker.

THE CANNERS' CLAIM TO AN EXEMPTION.

If the claim of the canners be stated in another way its strength is greatly increased. They might claim, for instance, that since periods of rush and let-down are characteristic of the canning industry, their employees can work up to their maximum hours in only a few weeks throughout the season, and if they were compelled to obey a 54-hour law they would be unable to work up to

(4) Boshart Bill (Assembly Bill Int. No. 808, Legislature 1910).

54 hours except in those scattered weeks. In other words, they might maintain that to enact a 54-hour law for their industry would in its effect be the same as to prohibit their working up to 54 hours except in scattered rush weeks. Such a claim, however, at once suggests many difficult questions.

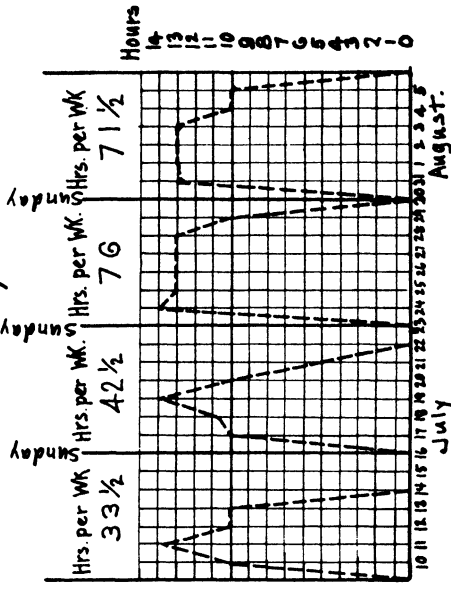
Could not canners, by regulating planting and harvesting, greatly minimize rush periods and regularize hours? Could they not, were hours restricted, secure a night shift to handle overtime work so that the day shift would work regularly up to the limitations fixed? We shall take up these questions in the next chapter.

OVERTIME ON LABELING.

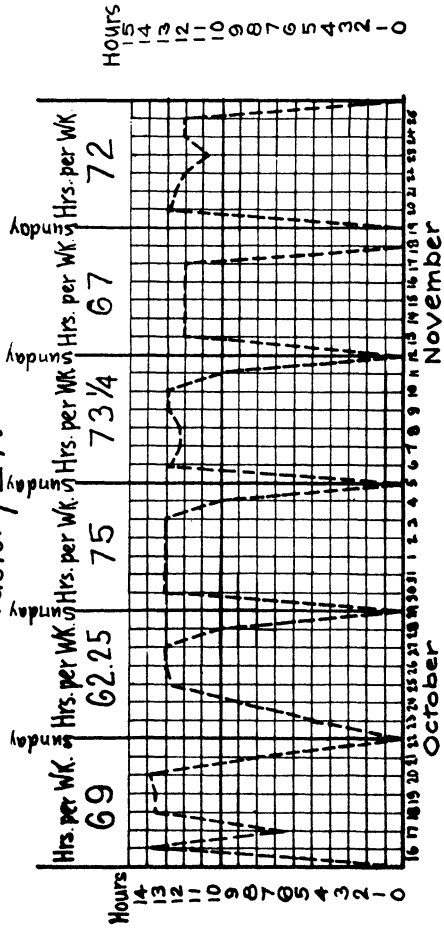
Dotted line represents hours of labor of one woman.

CHART XIX.

Factory 119.



Factory 27.



CHAPTER V

PREVENTION OF OVERTIME.

Until October 1, 1912, canning factories came under a law which forbade the employment of women for more than 12 hours per day or 60 hours per week. The majority of the canners have made no pretense of obeying it. Was this because it was impossible for them to comply with its provisions or was it because they made no real attempt to restrict hours?

HAVE THE CANNERIES TRIED TO RESTRICT HOURS?

Observations as a factory worker, conversations with many canners and official inspections have led to the conclusion that most canners have made but feeble attempts to prevent overtime. Even those repeatedly criticized for long hours have given little real consideration to the question. Their brain power has been expanded in figuring out how to make profits. They have preferred to repeat "The Lord ripens the crops and the situation is beyond man's control;" and have opposed any restrictions upon the hours of labor of women in their factories. Moreover, the men who have been the worst exploiters of women have most frequently represented the industry in its fight against regulation. We do not wish to be unjust in our criticism, but the facts sustain the above statements.

The canners have based their claim that the hours of women in their industry should not be restricted, on the fact that they were handling perishable products. Yet the man who has most generally represented them at Albany was, together with other canners, found to have worked women 13 and 14 hours a day on labeling cans, after the regular canning season was over. Chart No. XIX shows the hours worked by women in two of these canneries, labeling cans. If the canners had really tried to restrict hours there would have been no overtime on labeling, when no perishable products are at stake.

Another indication that many cannerymen have not tried to prevent overtime is that they have made no effort to distribute the hours of labor with any degree of equality among the women who were actually in their employ. On the same day some women were found working five hours and others sixteen hours. Charts Nos. XX, XXI and XXII for three canneries show for each day of the season the hours of the woman who worked longest hours, of the woman who worked the shortest hours, and the average hours of all the women:

Of course, there is an answer to this criticism: some work requires particular skill, and the workers cannot be shifted promiscuously from one task to another. This is more or less true, but neither our workers in the different factories nor our official investigators reported a single instance where an effort was made to prevent overtime by distributing the work among the workers who were actually employed in the factory each day. Certainly until the cannerymen make such an attempt, they cannot legitimately make the claim that they have done all in their power to prevent overtime.

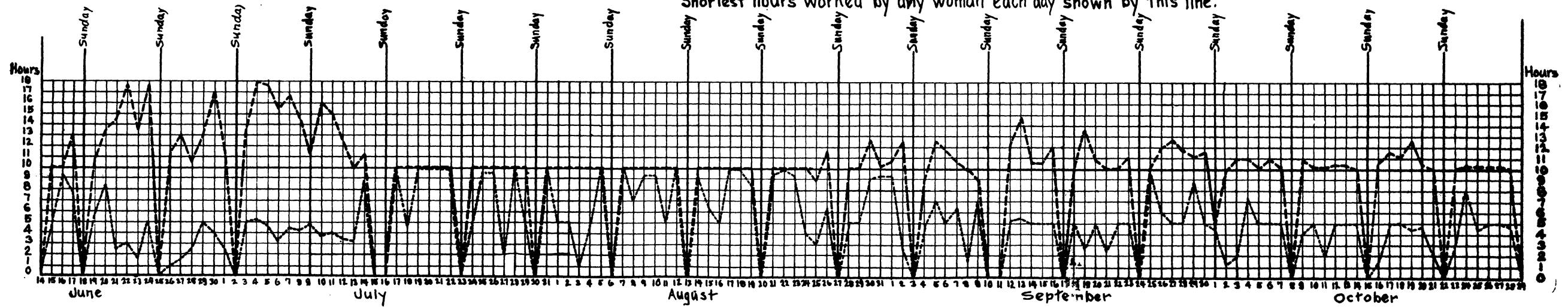
Happily, however, not all the men in the industry have been indifferent to the question of restricting the hours of women nor unwilling to consider a plan for reducing them which meant an increase in their pay-rolls. Certain cannerymen have, at considerable trouble and expense to themselves, according to their statements, limited the working hours of women in their factories while their competitors refused to do so. There are also a few — very few — men in the industry who have had enough respect for the law, even though they were not altogether in sympathy with its provisions, to make an attempt to comply with it.

As we come to deal further with the proposed methods for eliminating overtime, many other examples will be presented showing the failure of most cannerymen to make any real efforts in this direction. Certainly the fact that some of the cannerymen have employed women greatly in excess of sixty hours per week is no proof that it was necessary to do so.

LONGEST AND SHORTEST HOURS WORKED BY ANY WOMAN EACH DAY. Factory 62.

CHART XX.

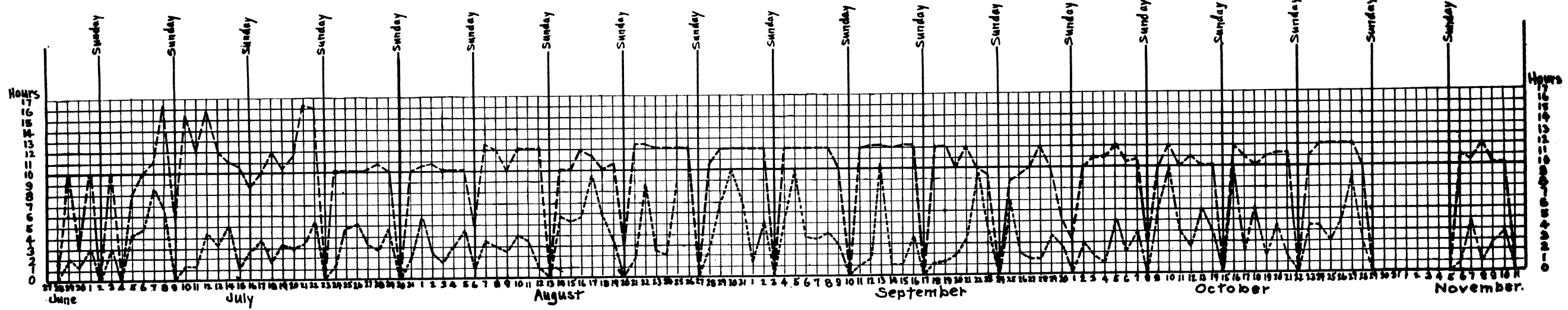
Longest hours worked by any woman each day shown by this line.
Shortest hours worked by any woman each day shown by this line.



LONGEST AND SHORTEST HOURS WORKED BY ANY WOMAN EACH DAY Factory No.4.

CHART XXI.

Longest hours worked by any woman each day shown by this line
Shortest hours worked by any woman each day shown by this line

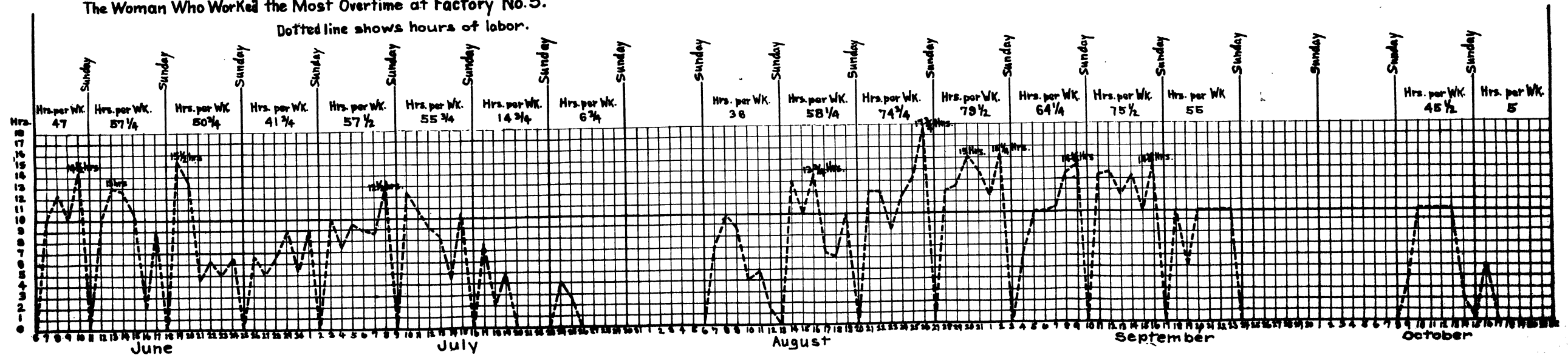


HOURS of EMPLOYEE No.7.

CHART NO. XXII.

The Woman Who Worked the Most Overtime at Factory No.5.

Dotted line shows hours of labor.



PROPOSALS FOR PREVENTION OF OVERTIME.

Summed up briefly, the whole cause of overtime work in the canneries is that an attempt is made to handle a varying supply of raw material with a fixed plant and labor force, and that during rush periods the capacity of the plant and labor force is exceeded. Overtime work necessarily results.

Clearly any solution of the overtime problem can come in but one of two ways: either by adjusting the supply of raw material so as not to exceed under any condition or at any time the capacity of the plant and labor force working within legal hours, or by increasing the capacity of the plant and labor force so that under all conditions and at all times they may be able to handle the product without overtime work. A combination of the two methods is of course possible.

The following suggestions for preventing overtime have been made:

1. That planting and harvesting be regulated so that only a certain amount of the product will be delivered at the cannery on any one day.

2. That cold storage be installed to hold the crops in rush periods until they can be packed without overtime.

Both of these are proposals for regulating the supply of raw material so that it will not exceed the capacity of the factory and the labor force.

3. That a double shift of workers be employed during rush periods.

4. That women be replaced by men who may work overtime without violation of the law.

Both of these are proposals for extending the capacity of the factory and labor force.

5. That the acreage contracted for be reduced to equal the capacity of the plant and the present labor force working within

the hours fixed by law, or that the capacity of the plant and the labor force be increased so that the product of the acreage now contracted for may be handled without overtime.

We shall throw as much light as possible on each of these proposals in all their ramifications.

REGULATION OF PLANTING.

There is great disagreement as to how much can be accomplished in the way of preventing "glut" periods by the regulation of planting and harvesting. Almost every pea canner can cite instances where peas planted days, sometimes a week or two weeks apart, have all matured on the same day. In some cases peas planted a week before others have matured first. An instance showing the difficulty of controlling the situation through a regulation of planting is related by one canner. On certain farms early peas were planted from April 9th to May 6th, but they all matured from July 5th to July 13th. Two farmers on adjacent farms planted late peas three days apart, one planting on May 17th and the other on May 20th. The crops matured nearly three weeks apart, viz., July 17th and August 6th, due to one planting having caught a local shower.

Rain or drought, hot or cold temperature, soil conditions and the lay of the land all tend to make the periods from planting to maturity a somewhat uncertain element. There are conditions, too, which make the canner's control of planting difficult. The first is the fact that often several days of rain so delay planting that the canner, to make up for lost time, will be tempted to plant a larger acreage per day than he might otherwise have done. A second is that much of the acreage is grown under contract with the farmers. The products they raise for the canners are often but a small item of their total crop, and they are unwilling to put aside their other business to follow the exact orders of the canners. To induce farmers to follow their strict orders, canners would have to pay much higher prices for their raw products.

In 1908 the State Labor Department made an exhaustive study of certain features of planting and harvesting, and, since we have been unable to repeat such a study, we shall present some of its facts which will throw just as much light on the subject as more recent figures could do. (1)

The table following, No. XIV, shows, for a representative cannery, the dates of planting, the periods between planting and maturity of peas in 1908.

(1) Annual Report, Bureau of Factory Inspection. N. Y. State Dept. of Labor 1908, Report on the Work of Women and Children in Canneries.

TABLE
 DATES OF PLANTING AND PERIODS BETWEEN PLANTING
Italics = early varieties;

| | DATE OF | | | | | | | | | | | | | |
|---|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | APRIL. | | | | | | | | | | | | | |
| | 18 | c19 | 20 | 21 | 22 | 23 | 24 | 25 | c26 | 27 | 28 | 29 | 30 | |
| Acreage planted..... | 1½ | ..... | ..... | ..... | ..... | ..... | 5½ | 21½ | 2 | 26½ | 18½ | 13 | 6 | |
| Early..... | | | | | | | 14½ | 1 | 16½ | 2 | 4 | ... | 6 | |
| Late..... | 1½ | ..... | ..... | ..... | ..... | ..... | 5½ | 7 | 1 | 11½ | 16½ | 9 | 6 | |
| Number of days from date of planting to
date ordered cut for acreage speci-
fied: | | | | | | | | | | | | | | |
| 44 days..... | | | | | | | | | | | | | | |
| 45 "..... | | | | | | | | | | | | | | |
| 46 "..... | | | | | | | | | | | | | | |
| 47 "..... | | | | | | | | | | | | | | |
| 48 "..... | | | | | | | | | | | | | | |
| 49 "..... | | | | | | | | | | | | | | |
| 50 "..... | | | | | | | | | | | | | | |
| 51 "..... | | | | | | | | | | | | | | |
| 52 "..... | | | | | | | | | | | | | | |
| 53 "..... | | | | | | | | | | | | | | |
| 54 "..... | | | | | | | | | | | | | | |
| 55 "..... | | | | | | | | | | | | | | |
| 56 "..... | | | | | | | | | | | | | | |
| 57 "..... | | | | | | | | | | | | | | |
| 58 "..... | | | | | | | | | | | 2 | ..... | ..... | ..... |
| 59 "..... | | | | | | | | | | | | | | |
| 60 "..... | | | | | | | | 7 | ..... | 13½ | ..... | ..... | ..... | ..... |
| 61 "..... | | | | | | | | 4½ | ..... | ..... | 4 | ..... | ..... | ..... |
| 62 "..... | | | | | | | | | | | | | | |
| 63 "..... | | | | | | | | | | | | | | |
| 64 "..... | | | | | | | | | | | | | | |
| 65 "..... | | | | | | | | | | | | | | |
| 66 "..... | | | | | | | | | | | | | | |
| 67 "..... | | | | | | | | | | | | | | |
| 68 "..... | | | | | | | | | | | | | | |
| 69 "..... | | | | | | | | | | | | | | |
| 70 "..... | | | | | | | | | | | | | | |
| 71 "..... | | | | | | | | | | | | | | |
| 72 "..... | | | | | | | | | | | | | | |
| 73 "..... | | | | | | | | | | | | | | |
| 74 "..... | | | | | | | | | | | | | | |
| 75 "..... | | | | | | | | | | | | | | |
| 76 "..... | | | | | | | | | | | | | | |
| 77 "..... | | | | | | | | | | | | | | |
| 78 "..... | | | | | | | | | | | | | | |
| 79 "..... | | | | | | | | | | | | | | |
| 80 "..... | | | | | | | | | | | | | | |
| 81 "..... | | | | | | | | | | | | | | |
| 82 "..... | | | | | | | | | | | | | | |
| Unknown or not harvested..... | 1½ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

c Sunday.

AND MATURITY OF PEAS, 1908, AT A REPRESENTATIVE CANNERY.
Roman = late varieties.]

MAY.

[illegible]

TABLE XIV.

DATES OF PLANTING AND PERIODS BETWEEN PLANTING

[Italics == early varieties:

| | DATE OF | | | | | | | | | | |
|---|--------------------|-----|-----|-----|-----|----|------|-----|----|-----|------|
| | MAY — (Concluded.) | | | | | | | | | | |
| | 21 | 22 | 23 | c24 | 25 | 26 | 27 | 28 | 29 | 30 | c31 |
| Acreage planted..... | 5½ | 19½ | 32½ | 1½ | 16½ | 5½ | .... | 17½ | 7 | 11½ | .... |
| Early..... | 4½ | 9½ | 16½ | 1½ | 5 | 3 | .... | 6 | 4 | 3½ | .... |
| Late..... | 1½ | 9½ | 16 | ½ | 11½ | 2½ | .... | 11½ | 3 | 8½ | .... |
| Number of days from date of planting to date ordered cut for acreage specified: | | | | | | | | | | | |
| 44 days..... | | | 1½ | | | | | | 1½ | | |
| 45 " | | | 2½ | | | | | 2 | | | |
| 46 " | | 1 | 4 | | | | | 4 | 2½ | | |
| 47 " | | 5 | 4½ | | | 3 | | | | 2 | |
| 48 " | 4½ | 1 | 2½ | | 5 | | | | | | |
| 49 " | | | 2½ | | | | | | | | |
| 50 " | | | d½ | | | | | | | | |
| 51 " | | | d½ | | | | | | | | |
| 52 " | | 2½ | d½ | | | | | | | | |
| 53 " | | | | | | | | | | | |
| 54 " | | | | | | | | | | | |
| 55 " | | | | | | | | | | | |
| 56 " | | | | | | | | 2 | | | |
| 57 " | | | 2½ | | | | | | | 2½ | |
| 58 " | | 1½ | | | 2½ | | | | | | |
| 59 " | | 5 | | | 4 | | | 2 | | | |
| 60 " | | | 2 | ½ | 2 | | | | 3 | | |
| 61 " | | | 4½ | | | | | | | 1½ | |
| 62 " | | | 3 | | 3 | | | | | | |
| 63 " | | | ½ | | | | | | | | |
| 64 " | | | 1½ | | | | | | | 4 | |
| 65 " | | | 1½ | | | | | | | | |
| 66 " | | 1½ | | | | | | 7½ | | | |
| 67 " | | | | | | | | | | | |
| 68 " | | | | | | 2½ | | | | | |
| 69 " | | 1 | | | | | | | | | |
| 70 " | | | | | | | | | | | |
| 71 " | | | | | | | | | | | |
| 72 " | | | | | | | | | | | |
| 73 " | | | | | | | | | | | |
| 74 " | | | | | | | | | | | |
| 75 " | | | | | | | | | | | |
| 76 " | | | | | | | | | | | |
| 77 " | | | | | | | | | | | |
| 78 " | | | | | | | | | | | |
| 79 " | | | | | | | | | | | |
| 80 " | | | | | | | | | | | |
| 81 " | | | | | | | | | | | |
| 82 " | | | | | | | | | | | |
| Unknown or not harvested..... | | | 2½ | a1½ | | | | | | b1½ | |

a Reported as maturing in 37 days, probably an error.

b Reported as maturing in 31 days, probably an error.

c Sunday.

d Early.

A careful examination of this table reveals two important facts; first that the planting was apparently carelessly done. One day 32 acres were planted, the next day $11\frac{1}{2}$ acres, the next day $5\frac{3}{4}$ acres, the next day $19\frac{1}{4}$ acres, the next day $32\frac{1}{4}$ acres, the next day $13\frac{3}{4}$ acres. Certainly if the peas had matured with any degree of regularity, rush periods would have resulted. It shows, secondly, that the periods from planting to maturity of peas planted on the same day differed greatly, and that even had the canner used his best efforts in planting so as to eliminate "gluts" he would have been unable to prevent them altogether.

The next table compares the acres of peas which actually did mature on each day of the harvest period with the acres which might have been expected to mature had they all maintained the average period of growth.





TABLE NO. XV.

DATES OF MATURITY OF PEAS, 1903, IN A REPRESENTATIVE CANNERY.

| Date. | Number of Acres Ordered Cut. | | | Number of Acres which would have matured at theoretical date set by average period of growth. | | |
|---------------|------------------------------|-------|--------|---|-------|--------|
| | Early. | Late. | Total. | Early. | Late. | Total. |
| June 16. | | | | 14½ | | 14½ |
| " 17. | | | | 1 | | 1 |
| " 18. | | | | 15½ | | 15½ |
| " 19. | | | | 2 | | 2 |
| " 20. | | | | 4 | | 4 |
| " 21a. | | | | | | |
| " 22. | | | | 4 | | 4 |
| " 23. | | | | | | |
| " 24. | | | | | 1½ | |
| " 25. | 9 | | 9 | | | |
| " 26. | 18½ | | 18½ | 14 | | 14 |
| " 27. | 1 | | 1 | 8 | | 8 |
| " 28a. | | | | | | |
| " 29. | 34½ | | 34½ | | | |
| " 30. | 6½ | | 6½ | | 5½ | 5½ |
| July 1. | 6½ | | 6½ | | 7 | 7 |
| " 2. | 4 | | 4 | 3½ | 1 | 4½ |
| " 3. | 9½ | | 9½ | 4½ | 11½ | 15½ |
| " 4. | | | | 8 | 16½ | 24½ |
| " 5a. | | | | | 9 | 9 |
| " 6. | 8½ | 9½ | 18 | 1½ | 6 | 7½ |
| " 7. | 9½ | 15½ | 24½ | | 4 | 4 |
| " 8. | 12½ | 9½ | 21½ | | | |
| " 9. | 9 | 5½ | 14½ | | | |
| " 10. | 13 | 21½ | 34½ | 20½ | | 20½ |
| " 11. | 2½ | | 2½ | 1½ | 2½ | 4 |
| " 12a. | | | | 4½ | 5½ | 10 |
| " 13. | 20½ | 14½ | 34½ | 9½ | | 9½ |
| " 14. | 5½ | 1½ | 7½ | 16½ | | 16½ |
| " 15. | 2½ | 3 | 5½ | 1½ | | 1½ |
| " 16. | 1½ | 3½ | 5½ | 5 | | 5 |
| " 17. | 7 | 5½ | 12½ | 3 | 4 | 7 |
| " 18. | | 1 | 1 | | 4½ | 4½ |
| " 19a. | | | | 6 | 3 | 9 |
| " 20. | ½ | 11½ | 12 | 4 | | 4 |
| " 21. | 2 | 9½ | 11½ | 3½ | 1½ | 5 |
| " 22. | | 4½ | 4½ | | | |
| " 23. | | 19½ | 19½ | 3 | 1 | 3 |
| " 24. | | 4 | 4 | | 11½ | 11½ |
| " 25. | | | | 7 | | 7 |
| " 26a. | | | | ½ | | ½ |
| " 27. | 4 | 15½ | 19½ | | 1½ | 1½ |
| " 28. | | | | 2 | 9½ | 11½ |
| " 29. | | 3 | 3 | | 16 | 16 |
| " 30. | | | | | ½ | ½ |
| " 31. | | 3½ | 3½ | 4 | 11½ | 15½ |
| Aug. 1. | | | | | 2½ | 2½ |
| " 2a. | | | | | | |
| " 3. | | 14½ | 14½ | | 11½ | 11½ |
| " 4. | | 4 | 4 | | 3 | 3 |
| " 5. | | | | | 8½ | 8½ |
| " 6. | | | | | | |
| " 7. | | 11½ | 11½ | | 3 | 3 |
| " 8. | | ½ | ½ | | | |
| " 9a. | | | | | 13½ | 13½ |
| " 10. | | | | | 3½ | 3½ |
| " 11. | | | | | | |
| " 12. | | 3 | 3 | | 2½ | 2½ |
| " 13. | | | | | | |
| " 14. | | 2½ | 2½ | | | |
| " 15. | | | | | 4 | 4 |
| " 16. | | | | | | |
| " 17a. | | | | | | |
| " 18. | | 4 | 4 | | | |
| Not reported. | | | | 16½ | 18½ | 35 |
| Not cut. | | 4½ | 4½ | | | |
| Totals. | 188½ | 204½ | 393½ | 188½ | 204½ | 393½ |

a Sundays.

Again it is demonstrated that there would have been periods of rush had all the peas matured after the average period of growth; but that the actual periods of rush were greater than might have been expected.

It certainly seems to be true that no canner can plant with such scientific accuracy as to prevent "gluts." There is always the unknown quantity — weather conditions. As one old factory employee said to an investigator who worked in the factory "You can't change the cause of nature." That does not excuse the canners, however, as some of them seem to think it should, from using their very best efforts to control planting in order to prevent rush periods as far as possible. Most of them hire "road men" to look after the planting and harvesting of peas. Few hire them on any other crop. Often these men are little fitted for their work. They know when peas are ready for the can, but they often lack the capacity to grasp the problem of the relation of planting and harvesting to the hours of work in the factory. In a general way they try to spread out the planting, but they do not figure out that the factory can handle only the normal product of a certain acreage in ten hours, and then attempt, by regulating the planting and harvesting, to eliminate rush periods. An example of the carelessness of many canners in this regard is told by the Federal Government investigator in Wisconsin.(2) A factory had the capacity to handle the normal product of fifteen acres of peas a day. They had planted fifteen acres a day, but regardless of the variety. "Early peas" mature about fifteen days sooner than "late peas." On a certain day the factory was glutted. Figuring back, the investigator found it was because on that date a day's planting of both early and late peas had matured together, as was to be expected.

The chief cause of difference in the time between planting and maturing is that seeds often lie in the ground some time before germination. Peas will be planted on a certain day. If the ground is dry and the weather cold, they may lie several days before germination. If other peas are planted every day in the meantime, naturally when a warm shower comes, they will all germinate together and mature together, causing a "glut."

(2) The Federal Government conducted an investigation into industrial conditions in the canning industry in Wisconsin in 1912.

Clearly the work of controlling planting calls for a scientific agriculturist who has with his agricultural knowledge the capacity to grasp the factory problem of keeping fixed hours. Until canners employ such men and set to work carefully to prevent gluts by regulating the planting and harvesting, instead of making only half-hearted efforts in that direction, the extent to which gluts can be minimized will not be known.

REGULATION OF HARVESTING.

The time of harvesting is largely fixed for the canner by nature. Most products are quickly perishable, and the sooner they are sealed in the can after leaving the field, the better is their quality. The period that different products may be held after they are ripe before they are harvested, without having to be packed as a lower grade of goods, varies for different crops and with weather conditions.

Opinion seems to be general that peas under the most favorable conditions cannot be held uncut more than 48 hours after maturing, and if the conditions are unfavorable not over 10 or 12 hours.

Beans, when matured, should be picked within 96 hours, the exact time being dependent on weather conditions. If held longer they grow too large and have to be packed as a poorer quality.

Corn may be left in the field after reaching maturity approximately two days, sometimes more, sometimes less, dependent also upon weather conditions.

Tomatoes, if allowed to ripen in the field, may be left unpicked without serious deterioration about 24 hours. A few canners have tomatoes picked slightly green and allow them to ripen off the vine saying they get "better color" by this method. Others maintain that this practice is undesirable.

Since therefore, there is such little leeway from the time these vegetables ripen until they begin to deteriorate, there is no great opportunity to adjust the amount of the crop harvested on any one day to the capacity of the plant. When the product is ripe it must be harvested before it spoils. There is, however, often a day's leeway which might be taken advantage of. Only one case

was discovered where the "road man" attempted to adjust the crop harvested on any one day to the capacity of the plant operated for ten hours.

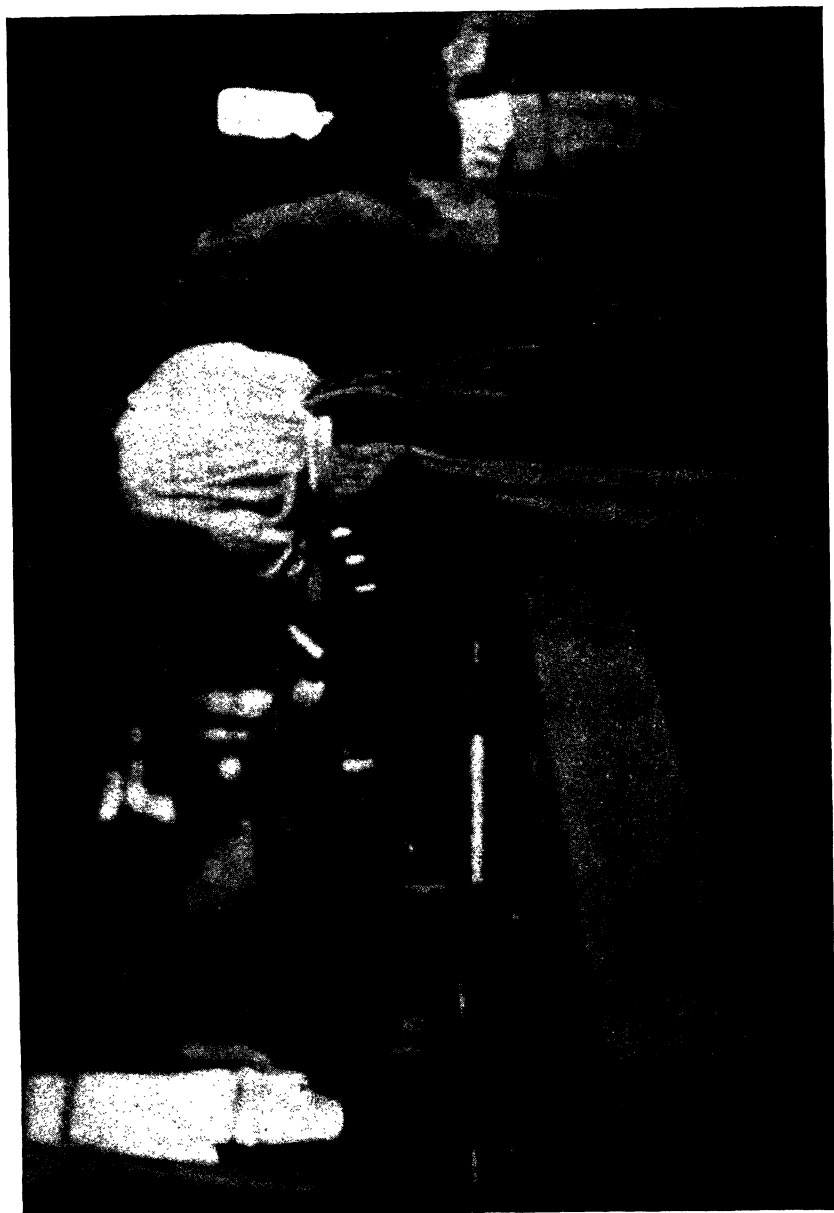
Our conclusion, therefore, regarding the possibility of regulating planting and harvesting with the aim of preventing overtime, is that while most of the cannerys have been negligent in this respect and have not minimized overtime where it might have been done, yet weather conditions seem to make impossible the abolition of all overtime by this method.

LOSS FROM SPOILING OF CROPS.

The cannerys have made the claim that they now lose large amounts of raw products which they are unable to handle even with overtime, and that if gluts could be prevented by regulating harvesting, it would be to their advantage to do so. From 32 factories we have reports as to whether losses due to spoiling of crops were sustained in 1911. Fifteen factories reported no losses; seventeen reported losses ranging from \$25 to \$3,000. (3) It is noteworthy that some factories working very long hours sustained large losses, while other factories working more moderate hours reported no losses. Several cannerys, unable to handle certain portions of their acreage, ordered farmers to let it go to seed, and really sustained no loss, since the value of the seed equaled what they paid the farmers. In many districts, however, the peas do not make satisfactory seed, or are filled with thistles, which prevent such a solution in the case of this product.

The fact that some cannerys occasionally lose raw material, usually in small amounts, is not, however, an indication that regulation of planting will not minimize "gluts," for the cannery balances the possible loss through spoiling of product against the certain expense of hiring intelligent road men. Clearly when he may work overtime to any extent, as has been the case, to run the chance of possible loss of materials is by far the less expensive plan.

(3) On one cannery's records was the following notation: "August 31, 1911. We received from farm 3,615 pounds of wax beans which could not be put up promptly enough, and therefore spoiled. The loss was due in a measure to the fact that growers crowded the cannery with corn, it being the last day of the \$10 and \$12 price. The loss can be avoided by not planting wax beans so as to mature seven days before or seven days after Sept. 1st."



WOMEN STAND WHILE "SYRUPING." IN THIS FACTORY THEY WORKED OVER 100 HOURS ONE WEEK.

The fact that canners with unlimited overtime sustain losses through the spoiling of products, is not a proof that the regulation of planting may not to some extent minimize overtime.

COLD STORAGE.

The second possibility in the way of adjusting the supply of raw material to the capacity of the plant is to hold goods after harvesting until they may be handled without overtime work.

Peas, after being harvested, may be held un-shelled for 12 to 14 hours under favorable conditions, without serious deterioration. If the conditions are unfavorable, the peas damp, or the weather hot, they become second grade goods if held over five hours. Many canners hold them overnight, so as to be able to start the factory the first thing in the morning. Up to this time, no successful artificial means have been used in New York State for preventing rapid spoilage of peas after they are cut. If held in cold storage they "sweat" when taken out, and besides losing weight they sour quickly. In Wisconsin, however, the Federal Government investigator found in use large tanks of running water in which shelled peas were immersed and held over night. The following is an extract from the Federal Bureau of Labor's forthcoming report on working hours of women in Wisconsin pea canneries:

"Of late there has come upon the market a cooling tank in which to preserve any excess supply of shelled peas over night. Water is kept running into the tank through pipes arranged along the bottom, so that the peas are not only kept cool but are prevented from being mashed by their own weight.

Nine of the fifty Wisconsin canners visited had equipment for keeping excess supplies of shelled peas in storage over night. Eight of the nine devices were for cold water storage. What the canners had to say about the system is of sufficient importance to report in detail, quoting verbatim wherever possible.

(1) Four cooling tanks used last year proved very successful. Pipes run along the bottom of the tanks (which are 8 to 10 feet long, $3\frac{1}{2}$ feet wide and $2\frac{1}{2}$ feet high). These pipes do not have round perforations, but are sawed through diagonally along under

their surface. The water comes through these slits with a swirling motion over the bottom of the tank in a continuous flow. When canning these peas nearly one-half more sugar is used for the 'Sweets,' but no more for 'Alaskas.' Firm sent sample cases of 'tanked peas' to their best buyers, who 'found no difference in them.'

(2) Have tanks with upward spray. Used them last year; not very satisfactory — toughens skin and peas also lose flavor.

(3) Kept peas over night last year in tanks of water which was changed every half hour. (These are not the modern spray tanks referred to by canner quoted in paragraph 1.) This proved 'so successful' that the coming year they are installing fifty tanks, each of which will hold one and one-half bushels of peas.

(4) Tried cooling tanks for keeping peas over night, and although they thought they 'were tended carefully' the peas had a slightly sour smell. Expect to try again this year if necessary, being especially careful. 'It is possible the boys might have been a little careless in caring for them last year.'

(5) Sometimes keeps large sized peas over night in cold water. The large peas are improved by the treatment, because they swell out and do not absorb so much brine.

(6) 'This year company is installing one large cooling tank at the recommendation of another canner who has tried cold water storage in emergencies with success.'

(7) 'Have three tanks for keeping peas over night.' Have not yet used the tanks.

(8) 'Have kept peas in these running water tanks for twenty-four hours without loss of quality.'

(9) 'Have attempted to keep peas over night in weak brine. They lost in quality. Have never tried running water through them.'

At a recent convention of Wisconsin canners the effectiveness of this device was under discussion. One expert in canning machinery who attended the gathering wrote the Bureau concern-

ing the conference as follows: ' We had quite a lively discussion in regard to the matter of providing cold water storage tanks for peas, which would enable the factory to put into this water storage such peas as arrived late at the factory or such peas as would be shelled out by the viners after working hours. This method of having a ready supply of peas early in the morning would enable the factory to start up promptly, full blast, instead of as at present, losing some time at the start of the day until the viners are in full running, and also seems to promise the possibility of shutting down the general departments of the plant at an arbitrary hour and avoiding overtime. The packers in discussing it seemed to think that, even if these advantages were shown at the start, there would be a tendency to drop back to the crowding method; but all who discussed the matter seemed to agree that there would be advantages in operation, as stated, in using the water storage, but that the peas held in this water, although the water would be constantly changing, would show some slight deterioration in flavor. Others contended, however, that they had tried this method of storing and that a slight increase in the amount of sugar added to the liquor which is used in pea packing would readily offset the slight difference that the water storage might make in the flavor.' "

It is possible that such devices will come into use in New York State and help to some extent to eliminate overtime work on peas. But apparently, even with these tanks, peas could be held only twenty-four hours, which will not make possible the complete abolition of long hours of labor.

It is worthy of note, however, that Wisconsin, not New York, canners have been experimenting with these devices. Wisconsin's 55-hour law for women applies to the canneries.

Beans after being picked may be held without deterioration from a few hours to two or three days, depending upon weather conditions. If held too long they wilt and toughen, when they are harder to snip and less palatable when canned. Many canners hold beans over night. One canner has held beans in cold storage for thirty-six hours, but reports that they wilt rapidly afterwards and are hard to "snip."

After being picked corn heats rapidly unless spread out, and may not ordinarily be held more than twelve or fourteen hours

without deterioration. If spread out it can often be held over night. No artificial means of preventing spoilage has yet been devised.

Tomatoes, unless they are picked green and allowed to ripen afterwards, may not be held without deterioration for more than twenty-four hours. They are sometimes held in cold storage, however, for longer periods.

FRUITS AND BERRIES.

Fruits and berries are in a different class from peas, beans and corn in that they may be held in cold storage.

Pears are always picked green and allowed to ripen in the factory. With cold storage only enough pears for a day's work may be allowed to ripen each day, and overtime work may be thus completely eliminated.

If cherries are damp when picked they rot more quickly than if dry. Berries picked damp soon develop "whiskers" and spoil. Even in these cases, however, they may be held for short periods in cold storage. When in good condition they are often held from one to four days in this way.

Some fruit and berry packers refuse to receive products unless in good condition, and by the use of cold storage have entirely eliminated overtime. There are at least seven fruit and berry canners who have obeyed the law fixing women's hours at 12 per day and 50 per week. All others with the exception of one establishment, which worked women up to 21½ hours a day, kept better hours than most of the packers of vegetables. By careful and conservative management and the use of cold storage severe overtime in many fruit and berry factories has been eliminated.

There appears to be, however, with our present knowledge of these matters, no way by which rush periods may be eliminated entirely, in vegetable canneries, through adjusting the supply of raw material either by regulating planting and harvesting or by preventing the spoiling of products after harvesting by artificial means.

USE OF A DOUBLE SHIFT.

We have seen that to prevent long hours of work for women either the supply of raw material must be reduced to fit the

Time card showing hours worked for
week by a woman at a factory.
First week the hours are
Monday----15 hrs. Thursday
Tuesday----20 " Friday
Wednesday--21 " Saturday
Total for week 76 hrs.
She got for this week 20 cents per hour

capacity of the plant and labor force or the capacity of the plant and the labor force must be increased so that the supply of raw material may be handled without overtime work.

The most evident way of increasing the capacity of the plant and the labor supply would be to bring in more workers during the day. In only a few cases, however, is a limited labor supply alone the hindrance to handling the crop during regular working hours. In the rush periods, when overtime is greatest, the machinery of the plant is usually taxed to its full capacity during the daytime and no more workers could advantageously be used. The inability of the machinery to dispose of the material within the legal hours of work for women is, therefore, very often the real cause of long hours of labor. Why not then get a double shift of workers, and thus double the capacity of the plant without working one set of workers overtime?

Nine factories in the State have used a double shift of workers during their rush periods. Three of these factories were situated in the city of Rochester, where a large labor supply is available. One was operated by a Syracuse company, which shut down its Syracuse plant during the pea crop, and in rush periods sent its Syracuse workers to act as a second shift in another of its factories in a neighboring village. Another company makes cans, boxes and crates, using the workers on these things as a double shift for the cannery during rush periods. In the other three cases no special conditions existed. In seven of these factories the double shift was not adequate or reliable enough to prevent overtime. In one factory no overtime was worked. From the ninth factory we have no time records. Several factories reported that mothers often replaced daughters, and vice versa, for overtime work, but this was done in only a limited number of cases.

The ease with which a double shift might be secured varies greatly from cannery to cannery. Some factories are located in large cities, some in small cities, some in manufacturing towns, and some in small country villages. Small canneries are found in large cities and large canneries in small cities. Obviously the supply of labor varies. In a considerable number of canneries which now work women overtime there should be no great difficulty in securing a double shift of local labor were higher wages

paid and continuous work assured. But, as one canner put it, "Some employers would rather employ a limited number of Italian women for long hours at low pay than to get a good supply of local laborers who are more independent." Other canneries which need a large number of workers and are located in small places would find it very hard to muster a double shift of local laborers.

The supply of labor depends, however, as we have seen in the chapter upon child labor, upon wages. In cannery towns, as elsewhere, a high wage attracts many workers, a low wage attracts few. No canner in the State has offered higher wages in his rush weeks in order to obtain additional help. In fact, as we shall see later in the section on wages, the pay of workers in the canning industry is very low — lower than in other industries in which large numbers of women are employed.(1) Certainly until women are paid more than 7 or 10 cents an hour for seasonal and intermittent work, no canner can claim to have exhausted his labor supply.

It is doubtful, however, even were wages doubled, whether a second shift of local workers could be obtained in certain cannery towns. For such places it has been suggested that a second shift of Italians be brought out from the cities. *Padrones* at several factories told investigators they could secure many more Italians or Poles if the cannery men wanted them. Certainly the supply of foreigners who might be imported from the cities is far from being exhausted, especially if better wages were offered.

The greatest difficulty in the way of solving the problem of securing a double shift is not, however, the fact that not enough workers could be secured for such a shift; it is the intermittent character of the work and the difficulty of knowing just when the double shift will be needed. Intermittent periods of rush and let-down are, as we have seen, characteristic of the industry. Sometimes in the rush periods the hours exceed the legal limits a great deal; sometimes but little. Usually the greatest rush is on peas. Even here, however, there would be but a very few days, and those at only a few factories, when there would be full eight hours' work for the second shift. On other crops a second shift

(1) See Chapter VIII.

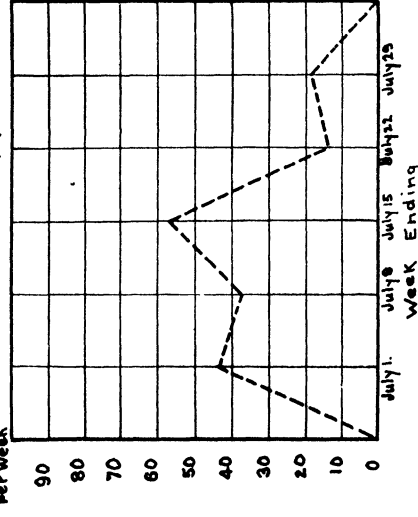
CHART NO. XXIII.

RELATION BETWEEN ACREAGE TO A CAPPER AND HOURS OF LABOR

Hours of Labor Are Shown By Dotted Line and Represented By the Hours of the Woman Who Put In the Most Overtime.

1st CANNERY

Hours 133 acres to a capper



could be supplied with only a few hours of work, and those only on a limited number of days.

Take the annexed chart (Chart XXIII), for instance, and note the few days scattered throughout the season on which employ-ment might be given a second shift.

The first week there are two days of overtime with a day between; the next week, three days of overtime; the next week, two days; the next week, none; the next week, one day; the next week, three days, not falling together. Then for four weeks there is no overtime. Then in the first week there are two days of overtime, not falling together; in the second week, five days, with a break of one day without overtime; the third week, six days; the fourth week, three days; and the fifth week, five days. On no day was there more than $7\frac{1}{2}$ hours of overtime work; usually only 2 or 3 hours; sometimes less. The total overtime for the season in this case was $95\frac{1}{4}$ hours, which would net a double shift worker \$9.52 were the pay at the rate of 10 cents per hour. It is obvious that even were wages doubled or trebled it would hardly pay double shift workers to hold themselves always in readiness for cannery work considering the small amount they could earn by working the few scattered hours of overtime. It would surely not pay Italians to come out from the city for such uncertain and intermittent employment.

Another consideration which renders the prevention of overtime by the employment of a double shift difficult is that a canner cannot tell in advance just when his rush is coming. He may expect it on a certain day only to find it postponed almost a week by a period of cold weather. Again a scorching day may bring the rush on very suddenly and catch him unawares. On some crops he may expect no rush that will necessitate overtime, and suddenly find it thrust upon him by adverse weather conditions. Clearly if a double shift were relied on for all overtime work, it would have to be always ready at the canner's word to take up the work where the day shift left off. The products would be harvested and subject to rapid spoiling. Advertising in papers or reliance on employment agencies would not answer the purpose. A thoroughly reliable double shift that would be always on call to

work a few hours of overtime scattered through the season would surely be very hard to secure.(5)

One cannery, as we have seen, makes cans, boxes and crates as a supplement to canning, and in rush periods turns its box and can makers onto the work of packing perishable products, thus being able to maintain a reliable second shift. This opens the way to the question, Why cannot all canners put in a supplementary industry and so secure two reliable shifts? There are, however, but few industries which suitably supplement canning and give at the same time employment to a large number of women. A few canners pack pork and beans or plum puddings — non-perishable goods — the packing of which might be used as supplemental work; but these, together with box and basket-making, are about the only industries which seem to meet at all adequately the requirements, and if many canners took up these industries the market would soon be glutted with their products.

Our conclusion is, therefore, that while certain canneries operating under special conditions may minimize and perhaps prevent overtime by employing a double shift for rush periods, it does not seem practicable for many canneries to meet the situation in that way.

REPLACEMENT OF WOMEN BY MEN.

To replace women with men would be of course no prevention of overtime. It would remove the legal difficulties, however, for no one has proposed a legal restriction of the hours of men's labor. Considerably more than half the cannery workers are women, and some of the occupations seem more suited to them. To secure men to replace women entirely would certainly be difficult in many factories because of the limited local labor supply. It would also require an increase of wages far beyond the present rates. Even now some factories experience difficulty in securing male help.

To improve considerably conditions as to overtime for women it would not be necessary, however, to fill all positions with men. As we have seen, each product passes through several processes.

(5) Another complication promises to arise if the proposed Factory Commission bill to abolish night work is enacted into law. Under such a condition the second shift would have to be composed entirely of men. In some cannery towns it would be almost impossible to secure for any wages which, within the bounds of reason, might be offered, a complete second shift of men for the intermittent rush periods of work.

Workers employed on the earlier processes finish their work at night and go home before the others. Those on the "capping line," the can dropper, the woman who puts on caps, the inspector and the syrup maker are among the last to leave, and, as we have seen, women are often used for these tasks. An examination of the time books in many factories shows that half a dozen or more women work half or three-quarters of an hour longer per day than the others. These are undoubtedly the women "on the line." Were these women replaced by men, as they might be at a small additional expense, the most extreme overtime would be eliminated. One or two factories use only men "on the line." They are worthy of imitation.

To entirely replace women with men would require a very heavy additional expense, and it is not certain that it would be wise to deprive women cannery workers of their occupation. Many depend on it either wholly or in part for livelihood. The replacement of women with men does not in itself seem to offer a complete solution of the overtime problem.

THE ADJUSTMENT OF ACREAGE TO CAPACITY.

An examination of the time records of canning factories reveals certain facts which suggest that the responsibility for overtime work does not rest entirely on the weather and that the situation is not entirely beyond the canner's control.

A few factories have kept very reasonable hours, while others packing the same products have worked extremely long hours. Two large factories packing peas, beans, and corn have not worked women over 12 hours per day and 72 hours per week or after 9 o'clock at night.

Another factory, among the first ten in the State in its packing of peas and beans, has not worked women over 13 hours per day and 67 hours per week in the last two seasons.

Factories keeping more reasonable hours have done so year after year, and those working extreme hours have a habit of so doing year in and year out.

Six of the thirteen factories which worked women over 18 hours on their longest day and five of the twelve factories which worked women over 90 hours on their longest week were operated by two companies.

One of these companies operating factories from one end of the cannery region to the other worked women extreme hours in all of them regardless of local conditions.

One factory which up to this year had worked overtime but not very extreme hours, and had paid good profits, secured this year a new manager, who said the factory was not operated up to its capacity and increased the acreage. This year the women in the factory worked much longer hours than they worked in 1910 or 1911. The manager boasts that next year he will again increase the pea acreage by 100 acres.

Evidently extreme overtime work is not due to the character of the industry but to the policy followed by many canners in the management of their business. The superintendent of one of the canneries which most seriously offends in working women extreme hours thus described this policy to an investigator:

"The way to make money in the canning business is to carry a little larger acreage than you can handle comfortably, so that you can run pretty steadily throughout the season and your plant won't be idle in slack periods."

How may overtime be eliminated? Again we shall let a canner speak for us. (6)

"In my opinion," said the superintendent of a large canning company, "the only way that the State can govern canning evils is to make the factories adhere to the rule of supply and capacity. Many factories contract for an acreage which the capacity of the factory could not turn out, making extra work and harrowing conditions for their employees inevitable. This is the root of the evil, to my mind."

As we already have seen, every vegetable canner contracts in the spring to purchase the product of a certain acreage. He cannot tell at that time whether a full crop will be returned; therefore he cannot figure on the size of the crop. He knows, however, from the experience of years, about how many cases each acre will yield when a full crop is returned. He knows exactly how many cases of each crop his factory is capable of canning in any given number of hours. Certain canners contract year after year for an acreage which they must know from repeated experience fore-

(6) Interview appearing in *Syracuse Journal*, November 29th, 1912.

dooms their employees to work overtime, and, if the crop is a good one, extreme overtime. "The Lord ripens the crop," truly, but every canner determines how much of a crop the Lord is to ripen for him. The relation between the acreage contracted for and the capacity of the plant is the factor which more than any other determines how much overtime will have to be worked.

How then may acreage and capacity be compared? What forms the best basis on which to estimate the capacity of a canning factory? We have seen that each product passes through several different machines. Clearly, the slowest of these fixes the capacity of a plant, as the weakest link of a chain determines the strength of a chain. It is impossible, however, to select this slowest machine. Sometimes it will be one machine, sometimes another. Therefore, even were it possible to pick out the slowest machine in each factory, comparisons could not be made. Sometimes labor is the slowest factor. For purposes of comparison between acreage and capacity, however, the latter may best be represented by the number of capping machines. Through them all the product of the factory must pass. They serve as the pulse of the factory on which we may place our finger to judge of its capacity. We make our comparison, therefore, between the number of acres to a capping machine, carried by different factories, and the hours of labor.(7) The hours of labor are measured in each case by the hours of the woman who worked the longest in each factory, and to simplify the problem as much as possible only the acreage of peas and hours of labor on peas are here considered. The following chart shows for six canneries the hours worked by the woman who worked the longest in each plant, and also the number of acres to a capping machine.

It will be seen that Cannery No. 1 carried 133 acres to a capper and reached 56 hours at the peak. Cannery No. 2 carried 138 acres to a capper and reached 70½ hours at the peak. Cannery No. 3 carried 146 acres to a capper and reached 75½ hours at the peak. Cannery No. 4 carried 196½ acres to a capper and reached 88 hours at the peak. Cannery No. 5 carried 238 acres to a capper and reached 92 hours at the peak. Cannery No. 6

(7) Not all factories are equipped with the same style of capping machines. All factory capacities are reduced, for comparative purposes, to terms of Hawkins cappers, the machine in most general use.

carried 266 acres to a capper and reached 96 hours at the peak. The greater the acreage to a capper the greater the amount of overtime. Canneries are like all other manufacturing establishments in this particular — if their capacity is overtaxed they have to be operated for long hours.

Another thing is clear also — that the hours of labor of women in the canneries are not beyond the control of the factory owners. Even though overtime may not be prevented by regulating planting and harvesting, by holding products in cold storage, or by the employment of a double shift, it can be controlled by adjusting the ratio between the acreage and the capacity of the plant, so that even in rush weeks the hours may not exceed 54 or 60, or whatever limitation the State imposes.

Most canners have, however, made little attempt to adjust acreage to capacity so as to eliminate overtime. Some frankly confessed they contracted for all the acreage they could get the farmers to grow, when asked on what basis they determined the size of the acreage they would carry. Canners usually sell from 50 to 100 per cent of their goods the winter before they are packed.⁽⁸⁾ Some confessed that they sold all the goods they could, and then contracted for an acreage to meet the sales. Very few stated that they based their acreage on the known capacity of their plant operated the legal number of hours. It is not to be wondered at, therefore, that many canners found overtime work necessary.

The practice which obtains in the three large factories which keep limited hours helps to meet the overtime problem. Two of them, as we have seen, do not work women over 12 hours per day or 72 hours per week, or after 9 a. m. The third has aimed to keep a 60-hour week, but has exceeded it by a few hours, never more than seven a week, during the past two seasons. At all three of these factories, when, after women have worked up to the limit, set and raw material still remained to be canned, they have been sent home, most of the machinery has been shut down, and the remaining product has been run through by the men who have been employed at the factory during the day. Of

(8) There is always a clause in the contract which makes it unnecessary for the canner to deliver in full if short crops prevent the packing of the amount of goods expected.

course this method could not be used were such an acreage carried that large amounts of raw material were frequently left over when the women's time was up. Combined however, with efforts to minimize rushes by regulating planting and harvesting, and with a limitation of acreage to the capacity of the plant, this practice helps to prevent overtime for women.

While it is true, as we have seen, that overtime may be eliminated by restricting acreage to the capacity of a plant, it is necessary to understand what the effect will be if hours are restricted by that method alone. It will not prevent rush periods. Unless canners are able to regulate the supply of raw material, or secure a double shift, the rush and let-down periods will occur just as they do at present, the only difference being that the peak of each crop instead of running to 72, 90, 100 hours, or wherever it now reaches, will run to the number of hours set by the law. In other words, women will be able to work up to 54, 60, 66 or 72 hours, or whatever limit the State puts upon the hours of work for women, only during a limited number of rush weeks scattered throughout the season. During all other weeks their hours of work will fall below that limitation.

Our conclusions, therefore, regarding proposed methods for preventing overtime are:

1. That most canners have made but feeble efforts to prevent long hours of work for women.

2. That a considerable number of fruit and berry canners by careful management and use of cold storage have eliminated work by women for more than 12 hours per day and 60 hours per week.

3. That indications are that in vegetable canneries overtime might be minimized, but not prevented, by regulation of planting and harvesting or the use of cold storage.

4. That a double shift promises to solve the problem in a few canneries where special conditions exist, but not generally.

5. That the replacement of women by men on certain tasks would eliminate individual cases of excessive overtime, but that the complete replacement of women by men does not seem to be a practical solution of the overtime problem.

6. That the canners by adjusting their acreage to their capacity, or vice versa, might so regulate their business as not to exceed, in their rush weeks, any limitation the State might fix on the hours of labor of women. Whether they could pay reasonable profits under some regulations is, however, a question.

Profits and the Regulation of Hours is the subject of the next chapter.

CHAPTER VI

PROFITS AND THE RESTRICTION OF HOURS.

From our consideration of the proposed methods for the elimination of overtime, namely, regulation of planting and harvesting, use of a double shift of workers, the supplanting of women by men, and the adjustment of acreage to capacity, it is obvious that they all call for a larger outlay of money on the part of the canner.

Can the industry afford to make such an outlay under present conditions? By reducing acreage in proportion to a plant's capacity, were the question of profits not concerned, a canner could so adjust his business that he would not run over any fixed number of hours per week in rush weeks, be the limitation 72, 60, 54 or even 40 hours. Whether he could make profits under present conditions of competition in the canning industry while working under some of these limitations is another question. Without doubt profits are one of the important considerations of the problem. It is unfortunate, therefore, from the standpoint of this investigation, that we have not had authority to obtain information regarding profits as well as hours of labor for women and children. A business man's profits, however, are usually considered an inviolable secret. What information we have seems to indicate that some of the canneries are making handsome profits. "We never fail to make money in the canning business," said the owner of one factory. On the other hand, there are some canneries with poor methods and antiquated management where profits are undoubtedly small. The report of one investigator is as follows:

"Small factory with many old-fashioned methods, such as blanching in small tubs. Caps are put on cans on a table, and cases are carried by hand to soldering table where three men do capping by hand (the work of one capping machine). Manager said he made less money each year and could not long compete with big canneries."

Probably few industries reward good management and penalize bad management as much as the canning industry. It is an industry which needs careful estimating in advance of the season and a cool head under trying conditions when the rush periods come on. Sooner or later an inefficient manager will find a shortage of labor, or cans, or an over supply of raw material he cannot handle, which results in serious loss. The sales end of the business, too, demands honesty under temptations. A dishonest canner, for instance, having sold goods in advance, and finding prices higher than when the sale was made, may deliver only in part, claiming a shortage in pack. Or he may deliver second for first grade goods. By such practices, however, he suffers in the long run and loses his trade to his honest competitors. For these reasons it is not surprising that, perhaps even more than in other manufacturing businesses, some men make good profits in the canning industry while others find it hard to make both ends meet.

In another way, too, the canning industry is unlike other industries; its profits fluctuate more from year to year. Canned goods prices vary according to the supply, and the supply each year depends upon the size of the crop returned. Some years profits are very large, some years scant. For this reason the canning industry is sometimes called "a gamble," even though its average profits compare very favorably with profits in other industries.

About twenty years ago the canning industry in the State had an unusual and somewhat unstable period of growth. Manufacturers of canning machinery went before farmers' granges and similar organizations and portrayed to them in glowing terms the benefits of a cannery. Small factories sprang up in large numbers, some of them in places where there was an inadequate labor supply, others too close together to be operated profitably. Often those starting the factories knew little of their operation. The result was cut-throat competition and unstable business methods. Gradually, since then, the poorly located and inefficiently managed factories have been weeded out, and while the process is not completely finished the business is to-day on a more stable basis than ever before.

Within the last few years three important canning companies have failed, one of them in an attempt to operate the same factories another had failed to make profitable. In these cases, however, many canners have told our investigators failure was due not to the instability of the industry, but to bad management. It is noteworthy that the plants of these companies have been bought or leased by other canners. (1)

We have definite information supplied by the owners or superintendents regarding the profits in certain canneries.

One factory, according to its superintendent, has never paid less than 5 per cent dividends in the last 6 years, and in 1910 paid 22½ per cent.

Another large factory packing vegetables and keeping very reasonable hours has paid on the actual value of the plant, after deducting all expenses and a reasonable amount for depreciation but leaving out of consideration "trade marks and good will," 24.5 per cent profit in each of the last 3 years. In 1911, 35.9 per cent profit was returned.

Another factory packing fruits and berries and keeping moderate hours has averaged 7.4 per cent on the actual value of the plant during each of the last 3 years. In one year a loss was sustained. In 1911 the profit was 8.3 per cent.

Another factory packing peas and corn returned \$1,453.62 to its owner in 1911, conservatively estimated at about 4 to 5 per cent on the value of the plant. (2)

Another factory returned \$6,951.93, which we estimate is at least 12 per cent. on the capital invested.

Another returned \$10,812.80 in 1911, probably about 18 per cent. on the capital invested.

Another plant in 1911 paid \$13,646.98 which we estimate to be at least 20 per cent on the capital invested.

The manager of the company operating the two plants which did not work women over 12 hours per day or after 9 a. m. stated that his profits were "satisfactory."

On December 3rd, 1912, a person signing himself "Director" and asserting that he had intimate knowledge of the operations of

(1) Five factories were operated. One factory was used as a viner station. In two cases the plants were bought up to destroy a nearby competitor for acreage.

(2) In making these estimates of profits we have attempted to be so conservative as to cover any possibility of exaggeration. The real per cent of profit is probably considerably greater than here estimated.

one of the largest canneries of the State wrote a letter which appeared in the New York Sun defending the labor policy of the canners, and especially of this factory. In this letter it was stated that the pack of this factory was 450,000 cases and that the profit of the canner was but half a cent to a cent and a half a can. There are 24 cans in a case; consequently this factory packs 10,800,000 cans. At the rate of half a cent per can the owners' profit would be \$54,000.00; at a cent a can it would be \$108,000.00 a year; at a cent and a half a can, \$162,000.00. Certainly, if these figures are correct, the business is not on the border of collapse. Most of the women in this factory are paid 8 cents an hour, and the article argues that their hours should not be restricted because they can make more money by working long hours.

One of our investigators worked as a laborer in this factory, being assigned to the labeling machine. At the rate the cans went through the machine(3) the owner made (at a cent a can profit) more in one minute than the women who worked in the factory made in one day.

It is not altogether certain, however, that some restrictions would reduce the profits in the industry. Department stores complained, in the days of small cash girls, that they could not get on without them. Pneumatic tubes have taken their places and the store owners would not return to the old days. Expensive mechanical contrivances replaced the children laborers in the glass factories of Illinois when the State took the children out of the industry. The employers gained thereby. Repeatedly increased efficiency has resulted from the improvement of labor conditions. Certainly the only result of the abolition of child labor for husking corn in this State will be to force the canners who have not yet installed mechanical huskers to do so, probably to their benefit. In this regard it is also interesting to note that in Wisconsin, which with New York shares the honor of packing the largest number of cases of peas in the country, and in which canneries come under the law restricting women's hours to 55 per week, the canners have been experimenting with tanks for holding peas while in New York they have not done so.

(3) See Chapter III for description of work of labeling machine.

One thing is certain, the enforcement of a restriction upon the hours of women in New York canneries would stimulate the owners to make greater efforts to control planting and harvesting, to install all devices for holding crops, to better distribute their work among women in their employ, and by other adjustments of their business to prevent overtime. How much, if at all, profits would be effected by the enforcement of a 54 or 60-hour law is a question that only experience can answer.

CHAPTER VII

WAGES AND THE RESTRICTION OF HOURS.

Canners have repeatedly made the claim that one of the causes of overtime work was the difficulty they experienced in getting sufficient help. In spite of this fact the wages of both men and women in the industry are very low. One factory pays women as little as 7 cents an hour. The following table shows the wages of the employees of 81 factories:

TABLE NO. XVI.
WAGES OF CANNERY WORKERS AT 81 FACTORIES.

| MALES 16 YEARS AND OVER. | | | | FEMALES 16 YEARS AND OVER. | |
|--------------------------|--------------------------|-----------------------|--------------------------|----------------------------|--------------------------|
| Rate.
per
hour. | Number
of
workers. | Rate.
per
hour. | Number
of
workers. | Rate.
per
hour. | Number
of
workers. |
| | | Brought forward. | 2,074 | | |
| 10 cents..... | 22 | 20 cents..... | 473 | 7 cents..... | 44 |
| 11 "..... | 2 | 21 "..... | 6 | 7½ "..... | 128 |
| 11½ "..... | 4 | 22 "..... | 25 | 8 "..... | 216 |
| 12½ "..... | 91 | 22½ "..... | 212 | 8½ "..... | 42 |
| 13 "..... | 8 | 25 "..... | 105 | 9 "..... | 93 |
| 13½ "..... | 2 | 27½ "..... | 21 | 10 "..... | 2,005 |
| 15 "..... | 882 | 30 "..... | 29 | 11 "..... | 44 |
| 16 "..... | 129 | 31½ "..... | 2 | 11½ "..... | 14 |
| 16½ "..... | 83 | 33½ "..... | 4 | 12 "..... | 25 |
| 17 "..... | 9 | 35 "..... | 4 | 12½ "..... | 168 |
| 17½ "..... | 828 | 40 "..... | 5 | 15 "..... | 39 |
| 18 "..... | 3 | | | | |
| 18½ "..... | 1 | Total number of | 2,960 | Total number of | 2,818 |
| 18½ "..... | 9 | workers..... | | workers..... | |
| 19 "..... | 1 | Average pay per | | Average pay per | |
| | | hour. 17.77c | | hour. 9.89c | |
| | 2,074 | | | | |

It will be noted that the wages of men average \$1.77 for a ten-hour day, while the wages of women average less than a dollar for the same time. The average pay per day for the canning season amounts, however, to much less, due to the great irregularity of work. This is true, in spite of the long hours of labor some weeks.

At many tasks women are paid for the amount of work they turn out. The snipping of beans, husking of cork, peeling of tomatoes, pears, peaches and beets, hulling of strawberries, quartering and coring of apples, stemming of cherries and labeling of

cans, are the tasks which are sometimes paid for by the piece work method. The rates vary a great deal from factory to factory, as hourly wages do, and are too complex to be presented in table form. It will suffice to say that generally they are adjusted so that the faster workers through speeding can make quite a bit more than they could were they paid by the hour.

To present information on the earnings of women we have arbitrarily selected the fifth woman on the pay rolls of 50 different canneries and give them the following table. The earnings of each one of these women represent fairly the earnings of all the women at the factory where she worked. Amounts earned on piece work as well as on time are taken into consideration.

TABLE NO. XVII.—*Concluded.*
SHOWING EARNINGS OF REPRESENTATIVE WOMEN IN FIFTY DIFFERENT CANNERIES.

[illegible]

It will be seen that the average weekly earnings of cannery women estimated from the earnings of these 50 women are only \$4.53. Certainly no woman could maintain a decent standard of living, even were she able to have steady work the year round on such a wage. Room and board may be secured in the cannery towns for from \$3.00 to \$5.00 a week. One of the "working inspectors" secured them at \$3.00 and reported that the food was so scant and poorly prepared that she could hardly live on it. But even if room and board are secured for that amount it is obvious that there is little left for clothing, to say nothing of other necessary expenses. Clearly the industry may be considered parasitic in the sense that a woman working in it cannot make a living wage but must find other means of support. True, many of the workers have fathers, husbands and brothers who are able to help them, but the single girl trying to make a living out of this work must find it hard sledding. The fact does not pass unrecognized. Following is the report of a young woman investigator who worked in the factories:

"There are several very 'fresh' bosses at the factory and the youth who keeps time and has charge of the sorting tables has a good deal of influence over the girls he puts on the tables. The situation is much like that in a department store where the floor walker has a lot of girls under him receiving low wages and all more or less at his mercy. Only up here night work makes the situation even more dangerous."

A few days later she reported again:

"I find that the time-keeper who was objectionable to me the other day has been insulting to several girls. He said to me, 'You can't make enough to pay you, but I will give you a chance to make 2 or 3 dollars on the side any time. If you come up here to work at night we can go for a stroll.' I feel that this ought to be repeated to you by me to show what the effect of an 8 cent wage is in the canning industry."

It surely is a commentary to find the time-keeper of a factory, who in this case was the superintendent's cousin, using the low wage as an argument for immorality.

Nor is this the only effect of the low wage. We have seen in the second chapter that in some cases children are routed out of

bed at 4 a. m. and forced to work until late at night, not by the cannery, but by their parents. The cannery supply them with materials to work on, the parents do the driving. Clearly this is not alone due to the hard heartedness of the parent. It is the necessary and logical outcome of a wage of \$4.53 a week for women workers, and a correspondingly low wage for men. And still certain cannery have argued that the children should be allowed to work because of the poverty of the parents. We are reminded of the story of the boy who killed his parents and when brought before the judge pleaded for leniency on the ground that he was an orphan.

Clearly, too, the general desire of the women to work long hours is also the logical outcome of so low a wage. One woman in 90 hours of work was able to make only \$6.75. It is not to be wondered that cannery women earning such low wages are afraid of any change that seems to threaten to reduce them still more. But it is to be wondered that a canner has the presumption to argue against restricting women's hours by saying, "The longer the day the better, because then the more money can be made." (1) Of course the women want to work long hours. They have to to make anywhere near a living wage.

That is not saying, however, that a restriction of hours will lower their wages. One "working investigator" reported:

"I believe that were the 54-hour law enforced here the wage would have to be increased from 8 cents because the girls would leave rather than work for 64 cents in a 10-hour day. I have talked with many girls about the new 54-hour law and they all say, 'Believe me, if I gotta work here for 64 cents a day I ain't staying long.'"

It certainly seems true that were the hours restricted the cannery, to keep their help, would have to raise the wages.

The "working investigator" also makes the following interesting report.

"All the Italian girls are sore at the low wage, but are afraid to quit on account of the Poles and the Americans. They would like to strike but say that the latter would take their places. The Syrians and the Poles are willing to accept the 8 cent wage. The

(1) See letter to New York Sun, Dec. 3, 1912, by a canning factory "Director."

Americans say it is too low and grumble, but would stick by the American employer rather than join the 'Eyetalians' in a strike."

Thus it is that at some factories one nationality is played against another and wages are kept down.

There have been, however, in the last two or three years a considerable number of strikes which at certain factories have forced wages up from the low rates that have existed for many years. It is to be wondered that strikes in the canning industry are not more frequent, because when an employer has several thousand dollars' worth of perishable products on hand he is likely to be quite willing to meet all reasonable demands rather than to see his product go to waste. But the labor force is shifting and miscellaneous and it seems difficult to arouse it to united action. It is interesting that the recent strikes have nearly all been organized among the Italians. The American laborers work on contentedly at the same rates which custom has maintained regardless of the great increase in the cost of living during the last few years.

Nor is this indictment of paying such low wages one that can be brought with equal weight against all other industries. Statistics show that compared with the wages of women in other industries their pay in the canning industry is exceedingly low. We have the interesting anomaly of an industry claiming a special exemption from the law restricting the hours of women in other industries on the ground that it cannot get sufficient help, yet paying lower wages than all others.

The following table gives the weekly earnings of women in the canneries as compared with other industries, the table being made up from the Bureau of the Census on weekly earnings of women in the busiest week of the season for selected industries in New York State in 1905, industries employing but few women being here omitted:

TABLE NO. XVIII.

WEEKLY EARNINGS OF WOMEN 16 YEARS OF AGE AND OVER IN SELECTED INDUSTRIES IN NEW YORK STATE.*

| INDUSTRY. | Number | Average weekly earnings. | PER CENT. DISTRIBUTION OF NUMBER OF EARNINGS. | | | | | |
|---|---------|--------------------------|---|-------------|-------------|--------------|---------------|----------------|
| | | | Less than \$3. | \$3 to \$6. | \$6 to \$9. | \$9 to \$12. | \$12 to \$15. | \$15 and over. |
| All industries in the state.... | 108,083 | \$6.54 | 6.5 | 40.6 | 34.6 | 12.8 | 3.7 | 1.8 |
| Bookbinding and blank book making..... | 2,010 | \$6.13 | 3.5 | 50.2 | 32.9 | 10.6 | 2.1 | 0.7 |
| Boots and shoes..... | 2,241 | 7.03 | 4.3 | 33.0 | 40.5 | 15.6 | 5.2 | 1.4 |
| Boxes, fancy and paper..... | 3,058 | 5.65 | 6.6 | 53.5 | 31.4 | 7.3 | 0.9 | 0.3 |
| Canning and preserving fruits and vegetables..... | 4,132 | 4.71 | 12.1 | 68.0 | 18.2 | 1.7 | .... | .... |
| Clothing, men's..... | 6,686 | 6.47 | 6.2 | 37.7 | 39.4 | 12.8 | 2.7 | 1.2 |
| Clothing, women's..... | 11,916 | 7.68 | 4.0 | 27.2 | 37.6 | 20.4 | 6.8 | 4.0 |
| Collars and cuffs..... | 5,330 | 7.68 | 5.7 | 27.2 | 32.9 | 21.0 | 9.1 | 4.1 |
| Confectionery..... | 2,443 | 5.09 | 7.1 | 66.6 | 20.4 | 4.9 | 0.8 | 0.2 |
| Hosiery and knit goods..... | 6,963 | 7.12 | 2.8 | 27.5 | 47.8 | 18.1 | 3.4 | 0.4 |
| Millinery and lace goods..... | 5,159 | 7.63 | 5.7 | 29.6 | 34.2 | 17.7 | 7.9 | 4.9 |
| Printing and publishing, book and job..... | 2,093 | 7.30 | 12.0 | 33.7 | 30.1 | 14.0 | 4.5 | 5.7 |
| Shirts..... | 2,893 | 6.29 | 12.7 | 35.7 | 34.4 | 12.5 | 3.6 | 1.1 |
| Silk and silk goods..... | 3,160 | 5.68 | 8.2 | 52.9 | 28.3 | 7.5 | 2.3 | 0.8 |
| Tobacco, cigars and cigarettes. | 8,763 | 7.36 | 3.3 | 29.4 | 43.8 | 18.0 | 4.7 | 0.8 |

* Derived from Bureau of the Census Bulletin 93, Earnings of Wage Earners, pp. 150-153.

Clearly, if a Minimum Wage Board is ever appointed in New York State it will find the canneries a fruitful field for investigation.

The possible effect of increased wages, or other increased cost of production resulting from regulation of hours or work of women or children, in raising the price of canned goods is a question of interest to the public. In his letter to the New York Sun on December second, the director of one of the largest canning companies of the State said, "I wonder do the American people ever stop to realize that these social uplifters are one of the chief causes of the high cost of living. If they had their way a can of tomatoes instead of costing 12 cents would cost at least 50 cents. This is the inevitable result of their endeavors."

In the light of this and similar statements the following cost of production figures from three factories are interesting:

TABLE NO. XIX.

SHOWING FOR THREE FACTORIES THE COST AND PROFITS FROM PACKING PEAS, BEANS, TOMATOES AND CORN IN 1911.³

| | EARLY JUNE PEAS. | | | ADMIRAL PEAS. | | | BEANS. | | TOMATOES. | | CORN. |
|---|------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|-----------------|-----------|
| | First factory. | Second factory. | Third factory. | First factory. | Second factory. | Third factory. | First factory. | Second factory. | First factory. | Second factory. | |
| Viner rent..... | .03571 | .01094 | .07543 | .03571 | .01094 | .07542 | .06596 | .06709 | .06108 | .06559 | .04776 |
| Brokerage and discount.. | .06556 | .06688 | .06435 | .06758 | .06766 | .06378 | .02349 | .01348 | .03524 | .02080 | .03243 |
| Expense office, taxes, traveling account..... | .02349 | .01348 | .03243 | .02349 | .01348 | .03243 | .45617 | .39562 | .44785 | .48535 | .33275 |
| Produce..... | .45100 | .66773 | .45773 | .42637 | .66773 | .43489 | .05533 | .04490 | .05124 | .06828 | .05442 |
| Insurance and interest.. | .05500 | .04490 | .05442 | .05668 | .04490 | .05442 | .03424 | .01514 | .05136 | .02304 | .03643 |
| Coal, oil and water..... | .03424 | .01515 | .03643 | .03424 | .01515 | .03643 | .09122 | .06167 | .1386 | .09148 | .05430 |
| Freight..... | .06790 | .06394 | .07095 | .06798 | .06394 | .07095 | .00783 | .00490 | .00746 | .00105 | .00576 |
| Seed..... | .03779 | .10532 | .04220 | .03800 | .10532 | .04220 | .34846 | .33745 | .46589 | .48768 | .32776 |
| Cans..... | .34039 | .31600 | .32932 | .34095 | .35503 | .33145 | .00712 | .00328 | .01067 | .00498 | .00948 |
| Solder, flux and gas..... | .00712 | .00328 | .00940 | .00712 | .00328 | .00940 | .10135 | .09939 | .14323 | .17207 | .10053 |
| Boxes..... | .10179 | .10103 | .10031 | .10154 | .10022 | .10082 | .03634 | .03446 | .05685 | .05239 | .05014 |
| Labels, labeling and nails | .03623 | .03446 | .03014 | .03624 | .03446 | .03014 | .00170 | .00137 | .01015 | .02633 | .02735 |
| Sugar and salt..... | .02042 | .01731 | .02735 | .01665 | .01731 | .02735 | .32350 | .34645 | .18232 | .19748 | .14346 |
| Labor (regular)..... | .11970 | .10095 | .16550 | .11947 | .10095 | .16552 | .19830 | .11211 | .29766 | .17546 | .22346 |
| Labor (yearly)..... | 1.9825 | .11510 | .23388 | .19848 | .11510 | .23386 | .00313 | .00200 | .00470 | .00305 | .00438 |
| Swells..... | .00314 | .00200 | .00438 | .00313 | .00200 | .00438 | .03681 | .02670 | .05502 | .04061 | .09400 |
| Depreciation..... | .03681 | .02671 | .09400 | .03631 | .02670 | .09400 | ..... | ..... | ..... | ..... | ..... |
| Cost per case of 24 No. 2 cans..... | \$1.63454 | \$1.70518 | \$1.83822 | \$1.61044 | \$1.74417 | \$1.98723 | \$1.77519 | \$1.55611 | \$1.93555 | \$1.91321 | \$1.54473 |
| Profit per case..... | .375 | .303 | .25 | .46 | .292 | .082 | .2467 | .433 | ..... | .0598 | ..... |
| Loss per case..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .0044 |

³ These figures are exact copies of official records at these three factories. We have information from other factories supporting their correctness.

It is interesting to note that in many instances the profit on a case of goods greatly exceeded the total cost of all "regular" or common labor, and in some instances exceeded the cost of all labor, "regular" and "yearly."

The cost of common labor in packing a case of 24 cans of peas at the second factory is \$.18232. The cost of common labor per can is a little less than \$.0076. If wages were doubled and men paid \$3.50 and women \$2 for 10 hours of work the cost of producing a can of tomatoes would be increased a little over a cent and a half. At the first factory the cost of common labor per case was slightly higher, and here a doubling of wages would have increased the cost of producing a can of tomatoes a little less than 1.65 cents.

Clearly, the above statement of the canner is exaggerated beyond the bounds of reason, and is an attempt to mislead the public by a statement which the canner himself must have known was incorrect.

Estimating from the factory of these three where common labor cost was greatest, a doubling of wages would have increased the cost of producing a can of peas a little less than 1.38 cents.

The labor cost on beans is slightly higher, and a doubling of the wages of common labor would increase the cost of packing a can of beans 2.89 cents.

Certainly, unless the canners took unjust advantage of the situation to boost prices, the public would have but little to fear from increased cost of canned goods resulting from reasonable regulation of labor conditions.

CHAPTER VIII

LAW ENFORCEMENT AND THE RESTRICTION OF HOURS.

The difficulty of enforcing the Labor Law in the canneries is a serious one. Most of the cannery owners have openly violated the law, and make no efforts to conceal the fact. Some even boast that they are above the law and can never be convicted. Experience has seemed to bear them out. Going back ten years we find very few successful prosecutions of cannery owners by the Labor Department. Prior to 1908 no prosecutions for violation of the Labor Law were brought. In that year, however, the Department of Labor instituted a large number of cases. The following table shows the results in cases brought for violation of the Child Labor Law:

TABLE NO. XX.
CHILD LABOR PROSECUTIONS, 1900-1910.*

| NATURE OF CASE. | No. of cases. | RESULT. | | | | | |
|---|---------------|-----------------|------------------------------|--|---------------------------------|---|-----------------|
| | | Ac-
quitted. | Con-
victed
and fined. | Con-
victed;
sentence
sus-
pended. | Pleaded
guilty
and fined. | Pleaded
guilty
and
sentence
sus-
pended. | With-
drawn. |
| Employing children under 14 years of age..... | 18 | 8 cases. | 1 case. | 2 cases. | 2 cases. | 1 case. | 4 cases. |
| Employing children under 16 for over 8 hours..... | 7 | 1 case. | ..... | ..... | 2 cases. | 3 cases. | 1 case. |
| Employing children under 16 without employment certificate..... | 8 | 1 case. | 1 case. | ..... | 1 case. | 4 cases. | 1 case. |
| Employing children under 16 after 5 p. m..... | 2 | 1 case. | ..... | ..... | ..... | ..... | 1 case. |
| Total..... | 35 | 11 cases. | 2 cases. | 2 cases. | 5 cases. | 8 cases. | 7 cases. |

* 1911 Labor Department Report not in print at time of writing this report.

It will be seen that in but 7 of the 35 cases were fines imposed. In five of those the cannery owners pleaded guilty.

Prosecutions for violation of the Child Labor Law, however, received better treatment than cases brought for working women and minors beyond the legal limits, as will be seen from the following table:

TABLE NO. XXI.

PROSECUTIONS FOR WORKING WOMEN AND MINORS BEYOND LEGAL LIMITATIONS, 1900-1910.

| NATURE OF CASE. | No. of cases. | Result. | | | | | |
|---|---------------|-----------------|-----------------|-----------------|---------------------------------------|---------------------------------|---|
| | | Ac-
quitted. | Dis-
missed. | With-
drawn. | Grand
jury
failed to
indict. | Pleaded
guilty
and fined. | Pleaded
guilty
and
sentence
sus-
pended. |
| Employing women over 12 hours in one day..... | 15 | 3 cases. | 6 cases. | 3 cases. | 3 cases. | ..... | ..... |
| Employing women under 21 years over 12 hours in one day..... | 2 | 2 cases. | ..... | ..... | ..... | ..... | ..... |
| Employing women under 21 years over 10 hours in one day..... | 3 | ..... | ..... | ..... | ..... | 1 case. | 2 cases. |
| Employing male minor over 12 hours in 1 day..... | 1 | ..... | ..... | ..... | ..... | 1 case. | ..... |
| Employing women under 21 years after 9 P. M. | 5 | 2 cases. | ..... | 1 case. | ..... | 2 cases. | ..... |
| Employing women over 60 hours in 1 week..... | 11 | 2 cases. | 9 cases. | ..... | ..... | ..... | ..... |
| Employing male minor over 60 hours in 1 week..... | 3 | 2 cases. | ..... | 1 case. | ..... | ..... | ..... |
| Employing women after 6 P. M. without posting printed notice of hours worked..... | 3 | ..... | ..... | 3 cases. | ..... | ..... | ..... |
| Total..... | 43 | 11 cases. | 15 cases. | 8 cases. | 3 cases. | 4 cases. | 2 cases. |

From this table it will be seen that out of the forty-three cases not a single conviction was secured, save where the canner pleaded guilty. Some cases were tried before judges, some before juries, but the results were always the same.

There are two reasons for this. The canner is often one of the first citizens of the town where the cannery is located. Many of the townspeople work in his factory, and most of the farmers in the surrounding territory sell him their products. Consequently they can hardly be considered an impartial tribunal before which to try cases. In one instance a labor inspector discovered that the local justice of the peace before whom he would have to bring his case was a foreman of a department of the canning industry.(1)

A second reason that the law has been so difficult to enforce is that the cannery townsfolk know better than any one else the

(1) The case was not brought, due to a failure of the inspector to get the evidence he needed to sustain his case.

irregularity of crop ripening, and understand but little the connection between acreage, capacity and hours of labor. Moreover, many of the women cannery workers themselves prefer to work overtime for the sake of the additional earnings. One investigator who worked in the factories report:

"The women with whom I have talked do not seem to appreciate the efforts which are being made in their behalf. They feel that they would rather be free to work as long and to earn as much money as possible."

Another investigator reports:

"This afternoon I sat next a new girl who began work yesterday. She was wondering how much she could earn, and a woman told her the law was now being enforced and we would not be allowed to make over \$6 a week; she expressed great dissatisfaction at this and thought the law stupid."

"Mrs. B—— who works at my table says she would gladly work every evening until 9 p. m."

No woman, however, works 12, 15 or 20 hours for pleasure. She does it for the money she can earn. And the lower wages are, the greater is the incentive to long hours of labor. The very low wages which are paid in the canning industry unquestionably largely explains the desire of the women to work long hours.(2)

But even if women do wish to work unrestricted hours, 80, 90 or 119 $\frac{3}{4}$ hours a week, that is not a reason, according to the United States Supreme Court, why they should be permitted to do so. Their children, their children's children, and the State have a vital interest in their health, and the courts have upheld the rights of the State to protect the health of women by limiting their right to contract to work more than a fixed number of hours.(3) However, it is evident in the cannery towns that, because of selfish interests and lack of sympathy with its provisions, there are few persons who want to see the Labor Law enforced.

(2) See next chapter.

(3) California: Matter of Miller, 124 Pacific Rep., 427.
 Illinois: Act of 1909 held constitutional in *Ritchie v. Wayman*, 244 Ill., 509.
 Act of 1911 held constitutional in *People v. Elderling*, 98 Northeastern Rep., 982.
 Louisiana: *State v. Grunewald*, Crim. Dist. Ct., Judge Joshua G. Baker, decided April 20, 1911.
 Michigan: *Withey v. Bloem*, 163 Mich., 419.
 Nebraska: *Wenham v. State*, 65 Neb., 394.
 Ohio: Ex parte *Hawley*, 198 Northeastern Rep., 1126.
 Oregon: *Muller v. Oregon*, 208 U. S., 412.
 Pennsylvania: *Commonwealth v. Beatty*, 15 Pa. Sup. Ct., 5.
 Washington: *State v. Somerville*, 122 Pacific Rep., 324.

In Illinois the Commissioner of Labor, in order to meet this situation, and to secure impartial tribunals to try cannery cases, often brings prosecutions in towns of the same county other than the town in which the cannery is located. By this procedure he has had considerable success in securing enforcement of the Labor Law in the canneries. In New York State present procedure makes it necessary for the Labor Department to bring cases before local courts or justices of the peace, and, according to legal practice, no case decided against the State may be appealed to a higher court. Were the law amended so as to permit the Labor Department to bring cases in other towns of the same county, as in Illinois, the law might find better support.

Even under such a change, however, cases would still be brought before a tribunal composed of people from country communities who understand that the "Lord ripens the crops," but who knows little of factory work and its demands, or of factory management.

Certain it is that, except in a very few instances, the Sixty-hour Law gave no real protection to the women who worked in the canning industry. Its only apparent effect has been to confirm, on the part of canners and cannery workers, a disrespect for the law and its agents, which is very noticeable. Whether this result has been due to the impossibility of securing enforcement of the law or to failure of the Labor Department to do all in its power to present cases so as to secure convictions, or whether a change of jurisdiction in labor cases will remedy conditions, are questions the answer to which can be definitely ascertained by experience alone.

FALSIFIED TIME BOOKS.

The keeping of accurate and correct time books, showing the actual hours of labor of women and children, is a fundamental necessity to the securing of adequate enforcement of the law. Unfortunately many canners have not kept such books.

The records of practically all canning factories show only the hours of labor of women and children who are paid by the hour. The hours of labor on piece work are seldom indicated. As we have seen, often a large part of the cannery work is paid for by the piece. Moreover, women will often work part of the day on

time and part of the day on piece work. One woman, for instance, was recorded as working sixteen hours in a day on time work and making over a dollar in piece work beside. One canner, in the past, has worked women up to their 60 hour limit on "time work," and then transferred them to piece work, putting piece workers in their places. Since he has kept no record of the hours of labor on piece work it appears from his time book that he has obeyed the law, when, as a matter of fact, that has not been the case. Obviously it is very necessary to the securing of enforcement of the law that the canners be compelled to keep records of the hours of labor of women who work on piece work as well as of those who work "on time."

A few canners have gone beyond keeping their time books carelessly and have deliberately falsified them to show apparent compliance with the law. An investigator was sent to obtain employment in one of these factories and discovered that in one week many of the women worked over 100 hours. The Factory Commission went to the plant, and the owner and superintendent was compelled to admit, under fire, that his time records were falsified "to deceive the inspector and show compliance with the law." He was compelled to produce the correct time records, which showed that one woman, instead of working 60 hours, had actually worked twice as long, $119\frac{3}{4}$ hours in a week. Many women worked over 100 hours.

Unfortunately not all of the canners who falsified their time books were visited by the Commission for public hearing, but there are five other factories besides this one where it is almost a certainty that the time books have been incorrectly kept so as to show apparent compliance with the law. At one factory the writer of these pages worked as a laborer in 1910, keeping a record of the hours of labor of the women. On some days women worked up to 14 and 16 hours, but the time books fail to record such cases and show only hours of labor up to 12 per day. At another cannery the books themselves have been erased and altered so that the last days of each week show only a few hours work, and the total hours for the week are 60.

Clearly men who follow such practices deserve to be brought before a court of law and fined heavily. Unfortunately the law

does not make sufficient provision for their cases. But in addition to preventing such practices the Labor Department should exercise the power it now has to force all canners to keep accurate records showing all of the hours of labor of all the women in their factories, those who work by the piece as well as those who work by the hour.

CHAPTER IX

SANITATION AND HOUSING.

SANITATION CONDITIONS IN FACTORIES.

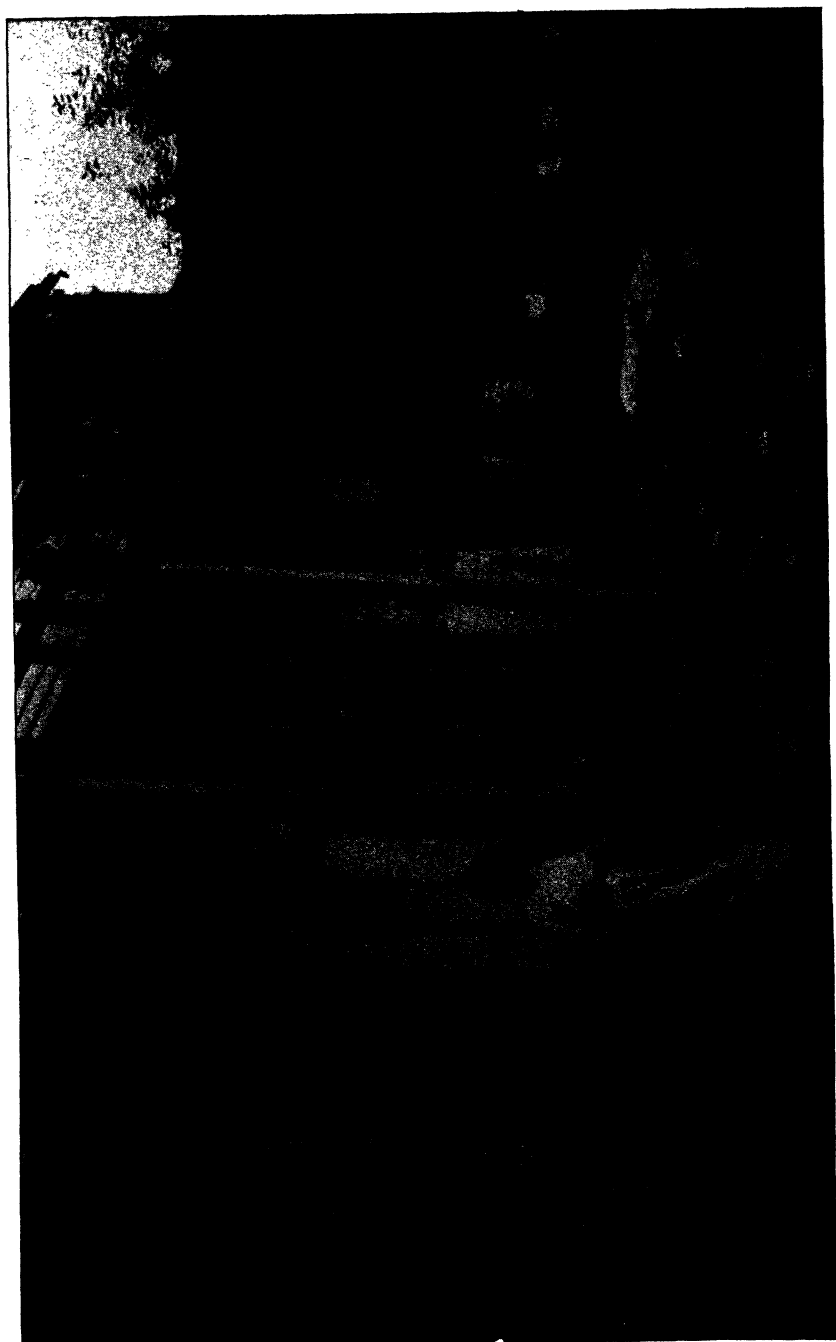
The sanitary conditions in the canning processes of New York State canning factories are usually excellent. Most canners take every reasonable precaution to guard their products from contamination, and the pure food provisions against the use of artificial preservatives make it impossible to can products which have begun to decay. The time has passed when bluing may be used in syrup to make it white, when copper sulphate may be used in peas, or cochineal coloring in tomatoes. A few canners still use benzoate of soda for preserving; but only in small quantities, and then the label always shows its presence. The public has little to fear from the health standpoint in consuming New York State canned goods. In a few factories, the sanitary conditions approach the ideal.

There are, however, two conditions in connection with many factories which are unsatisfactory, viz., washing facilities and the toilets.

WASHING FACILITIES.

Many factories fail to provide adequate facilities for the employees to wash their hands. In 12 factories the washing facilities were reported excellent; in 17 good, while in 70 they were inadequate. Some factories provided no facilities whatever other than the tanks in which cans are cooled after coming from the cooker. Only a few canners provided soap and towels, and often where towels were found, they were decidedly in need of the laundry.

In factories where food products are canned there can be little excuse for failure to provide proper washing facilities. The few canneries which do provide fine sinks and fresh towels, and display signs directing employees to wash their hands after coming from the toilets, are worthy of wide-spread imitation. It really is difficult to understand why any canner should need the com-



POOR HOUSING CONDITIONS, NOTORIOUSLY BAD FOR YEARS. THE CANNER PROMISED IMPROVEMENT.



pulsion of the law to force him to provide adequate washing facilities, when not to do so is to open himself to criticism which may seriously cripple his business and that of his fellow cannerymen.

TOILETS.

Nor can one easily understand the failure of many of the cannerymen to keep their toilets clean. Because of the fact that many canneries are situated in small villages or in the outskirts of cities where there are no sewer connections, the majority of the cannery toilets are, of necessity, privy vaults. Of the 225 toilets for males at 100 factories, 167 were privy vaults, the other 58 being flush toilets with sewer connections. Of the 280 toilets for females, 164 were privy vaults and 116 were flush toilets connected with the sewer.

The privy vaults which predominate are always difficult to keep clean, especially when used by foreigners, who are careless in their habits. That is not a reason, however, why the cannerymen should abandon them to filth, but a reason why they should take unusual precautions to promote cleanliness. The toilets at many factories, however, are badly neglected. At a few factories the privy vaults were cleaned and disinfected periodically; but at many they were full, and apparently were not cleaned out from the beginning to the end of the canning season.

The cleanliness of toilets for males at 89 factories was reported on as follows: Excellent, 9; good, 41; poor, 27; filthy, 12. The cleanliness of toilets for females at 92 factories was reported on as follows: Excellent, 17; good, 46; poor, 23; filthy, 6. In general, toilets located in the factories were in better condition than those located in the yards. Most of those in poor or filthy condition were privy vaults, and all but 3 of these (out of 231) were in the yards. Even there, however, they are objectionable enough, and it is hard to understand why men engaged in the packing of food products should be willing to open themselves to attack because of failure to take reasonable sanitary precautions to keep their toilets clean.

Three factories failed to provide separate toilets for the sexes, as the law requires. Two factories provided toilets for women, but none for men. One of these was a factory just opened in

1912; the other was off the railroad track, and although it had been in operation for six years, had never been visited by a factory inspector.(1)

HOUSING.

When Italians, Poles or Syrians from the cities are employed in the rural canning factories, housing facilities are provided for them by the canner. Forty-four per cent (44%) of the cannery import foreign help, and year by year the number doing so grows larger. At canneries where only a few foreigners are employed, a part of the factory, a rudely constructed shanty, or sometimes a barn, is used for housing them. At the largest colony in the State, a regular little village has been built up with many houses, a store run by the *padrone*, and even a school, supplied by the canner. Usually no rent is charged for these living quarters, though one canner asks the nominal rent of \$1 per month for each room.

Three general types of buildings were found in use:

(a) Tenements — buildings in which three or more families keep house independently.

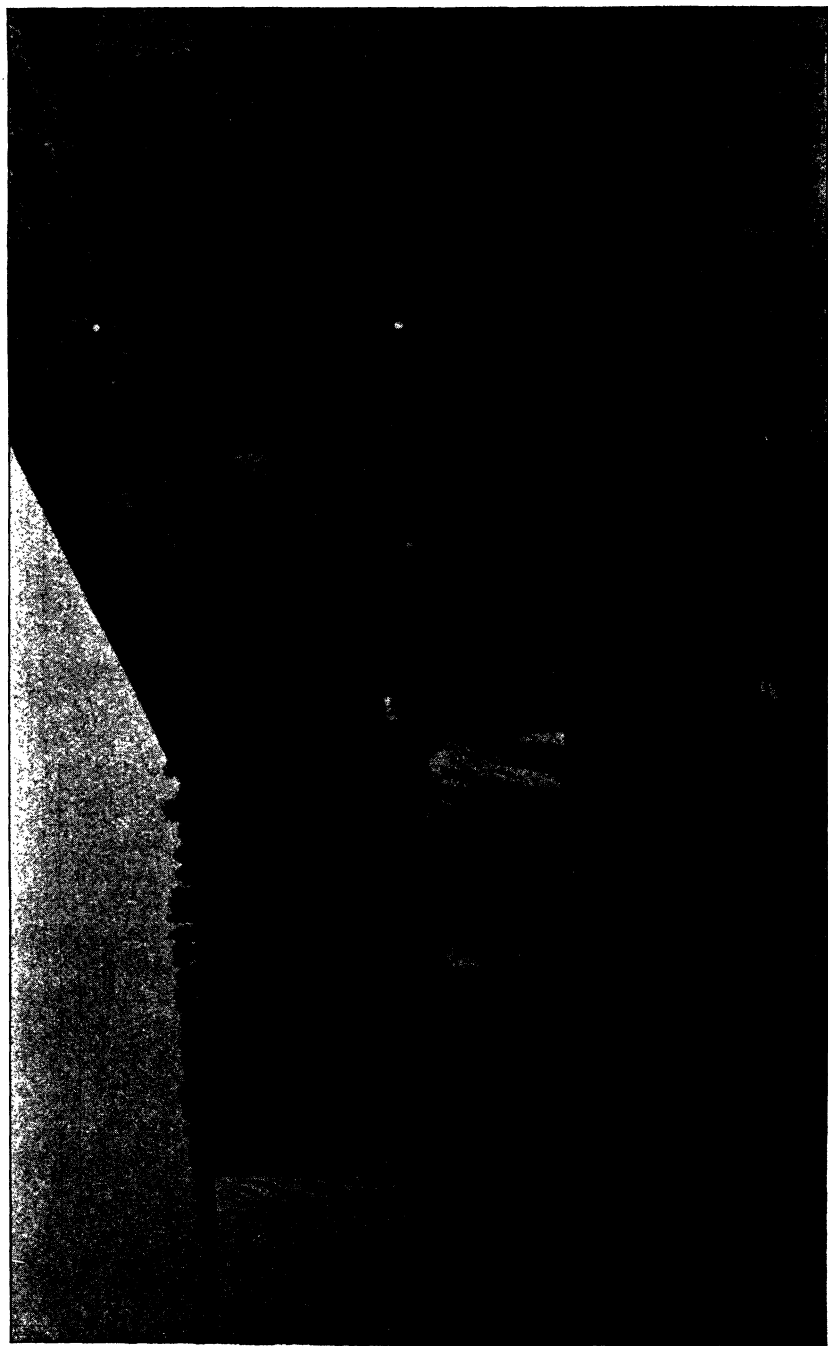
(b) Barracks — buildings in which three or more families live, having a common cooking place.

(c) Shacks — separate houses in which not more than two families are housed.

Fourteen cannery furnished tenements, 21 barracks, and 6 shacks for their imported help. Besides these, one canner quartered the foreigners in remodeled abandoned box cars; another housed them in an old barn, and still another in a room over his "shed."

At the latter two places, the conditions were especially deplorable. In the old barn, 30 persons, men, women, boys and girls, were all lodged together. Bundles of straw were provided by the canner for beds. The only division of sleeping quarters consisted of burlap pinned together to shield one hundle of straw from another. Growing boys and girls together with adults of both sexes slept on the floor, with hardly the semblance of privacy.

(1) Another small factory was investigated which had operated ten years without being visited by a factory inspector.



AN EXAMPLE OF COMPARATIVELY GOOD HOUSING CONDITIONS.

In the living quarters over the shed, six Italian families, comprising about 24 people, were housed together with total lack of privacy. The room was divided by a sheet of canvas, behind which they all slept on cots, or in most cases, on mattresses on the floor. Girls of 10, 12 and 13 years were lodged here with adults of both sexes. The extra clothes of all hung about on nails on the wall. In spite of these conditions, the canner did not seem impressed when the inspector called his attention to the need of better housing facilities.

At another factory, a room in the second story comprised the living quarters. Army cots were provided, but there was absolutely no separation of the sexes.

Fortunately for the workers, some cannery furnished better facilities. One provides separate little houses for each family, and keeps them in good repair. Another has this year built a concrete tenement building for his Italians, making ample provision for light, air and ventilation. Still another has this year constructed new quarters for his imported workers that are roomy and satisfactory. One canner is planning to rebuild entirely his barracks for foreigners, even going so far as to install a complete sewer system, although the quarters are situated on a farm where there are no regular sewer connections.

It must be said that the last few years have seen a marked improvement in certain cannery labor camps. There still remain in many camps, however, conditions which beggar description, and which are a discredit to the canning industry of New York State.

ROOM OVERCROWDING.

Whole families are often placed in one room regardless of the number in the family, the privacy of the sexes, or sanitation. A few examples of this room overcrowding and lack of privacy, taken at random, follow:

The table shows the number of occupants to a room fourteen feet square, at one labor colony, where each family was assigned to a room.

TABLE NO. XXII

NUMBER OF PERSONS PER LIVING AND SLEEPING ROOM, AT ONE CANNERY COLONY.

| ROOM
NUMBER. | Parents. | Males. | Females. | Total. |
|-----------------|----------|--------|----------|--------|
| 1..... | 2 | .. | .. | 2 |
| 2..... | .. | 4 | 1 | 5 |
| 3..... | 1 | 1 | 4 | 5 |
| 4..... | 1 | .. | 2 | 4 |
| 5..... | 2 | 5 | 1 | 8 |
| 6..... | 2 | 3 | 2 | 7 |
| 7..... | 2 | 1 | .. | 3 |
| 8..... | 1 | 1 | 1 | 3 |
| 9..... | 2 | 1 | .. | 3 |
| 10..... | 2 | 5 | 3 | 10 |
| 11..... | 2 | 3 | 3 | 8 |
| 12..... | 2 | 3 | 2 | 7 |
| 13..... | 2 | 2 | 4 | 8 |
| 14..... | 1 | 1 | 2 | 4 |
| 15..... | 1 | 1 | 1 | 3 |
| 16..... | 1 | 3 | 3 | 7 |

It will be noted that in one room, ten people, six males and four females, lived and slept. In three cases, eight persons occupied one room, while in three more cases, seven persons of both sexes occupied a single room. Such room overcrowding would be hard to find in city tenements.

At colony No. 2, in rooms of the uniform size, 15 x 11 feet, the following groups were housed: 8, 2, 3, 5, 4, 4, 2, 4, 3, 3, 4, 4, 3, 2, 4, 5, 4, 4, 5.

At colony number 3, in uniform rooms of 10½ x 6 feet, the following groups each occupied one chamber: 6, 5, 4, 2, 1, 1, 4, 4, 6, 2, 9, 7, 6, 5, 1, 1, 2, 3, 2, 2, 3, 5, 6, 7, 5.

Certainly 9 persons of both sexes, indiscriminately lodged together in so small a place, is not conducive to health or morality. This colony shows the worst extreme of over-crowding; but it illustrates graphically the extent to which this system of housing is likely to degenerate if left unregulated.

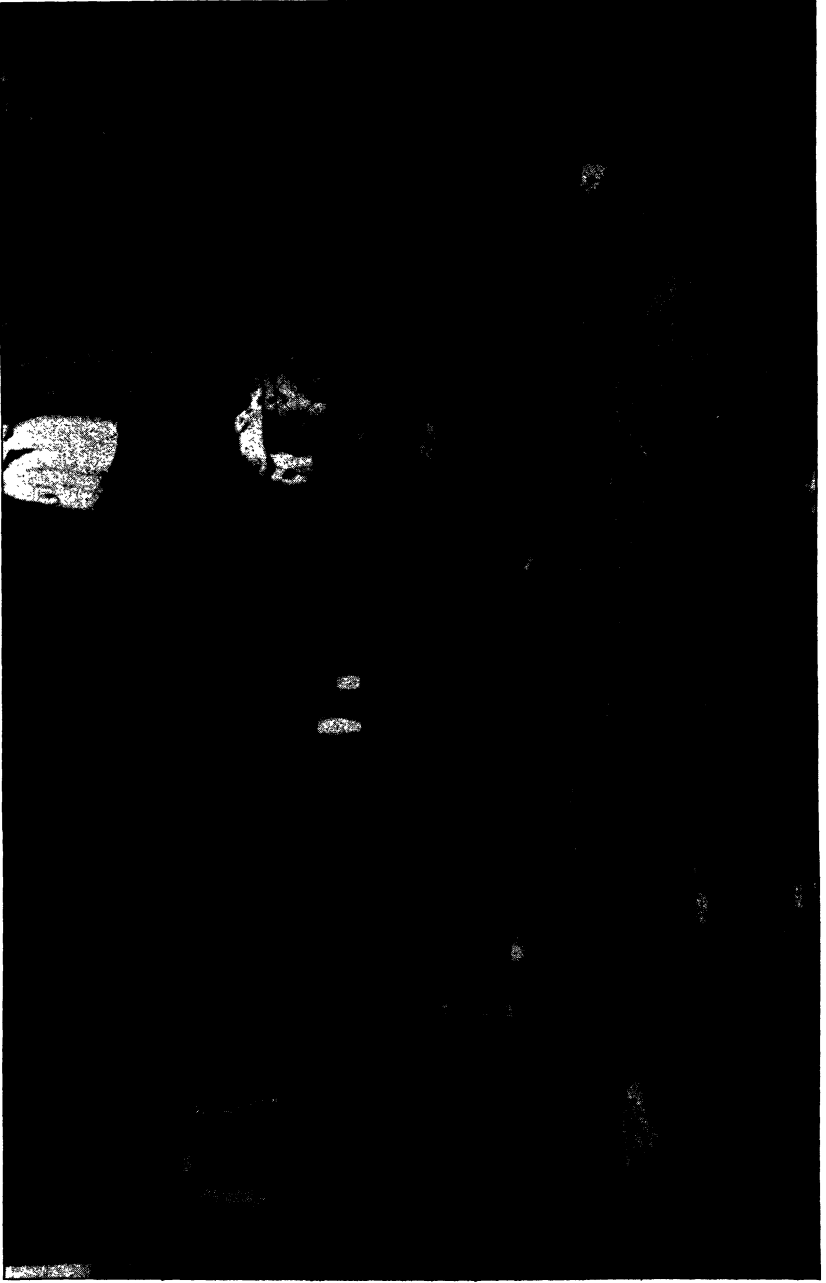
At another colony in rooms of uniform size, 13½ x 9½ feet, the following groups were housed:

2 adults and 2 children under 10 years.

Mother, father, daughter, son-in-law, and 3 children under 10 years.

Mother, father and child.

Mother and 3 daughters (20, 18 and 10 years, respectively) and a son of 16 years of age.



INTERIOR EXAMPLE OF BAD HOUSING CONDITIONS.

Mother, father, daughter, son-in-law, their child, a niece and nephew.

Husband and wife and two babies.

Husband and wife and 4 children under 10 years.

LACK OF PRIVACY.

As will be seen from the above instances, no attempt is made on the part of many cannery workers to secure for the female workers the ordinary privacy their sex makes necessary. Frequently adolescent boys and girls are compelled to use the same room for dressing and sleeping. At the fourth colony, three girls aged 20, 18 and 10 years, and a boy of 16 years were all lodged together. Nor is this an unusual condition. At some colonies boarders live in with families of growing boys and girls. In one cannery where a large barrack was occupied exclusively by unmarried men and women, the inspector found the partition which was built to separate the chambers broken through, making perfect freedom of passage between the rooms.

A few of the cannery workers do better than this in the matter of privacy. The one who provides a concrete house gives each family two rooms with a concrete wall between; another gives each family a separate house, usually with two or more rooms; another has divided the compartment of each family into two parts by substantial wooden partitions six feet high. Generally, however, whole families, sometimes with boarders, are crowded into one room, regardless of age or sex.

It is noteworthy in this regard that the Buffalo Commissioner of Health, Francis E. Fronczak, who is probably more familiar than any other person with health conditions among the Poles of Buffalo, testified at a public hearing of the Factory Commission that he had traced many of the illegitimate births among them to the conditions in the cannery colonies.

CLEANLINESS.

Though there seemed to be little extra space in the cramped quarters, the rooms were invariably found to be filled with various articles of food, cooking utensils, and drying clothes. There was usually one window, which was often nailed shut.

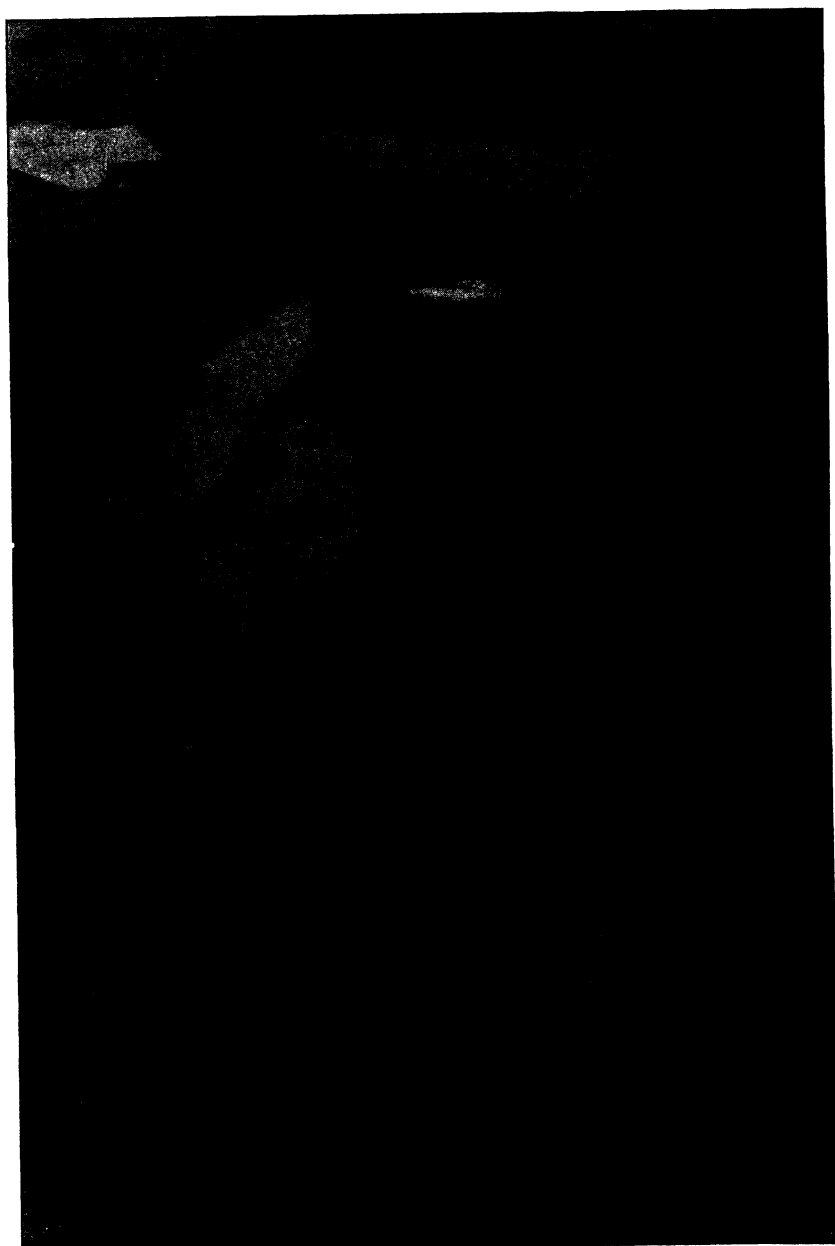
The cleanliness of these apartments is largely a matter of individual hygiene. Only 2 out of 37 houses were reported as clean; 18 were in good condition, 15 were dirty, and 2 were absolutely filthy. Swarms of flies, attracted by the exposed and strong-smelling food, are a pest and a menace to the health of the colony.

Undoubtedly the general insanitary condition of many of these places is the direct result of long hours of toil in the factory by the women of the colony, leaving them little time and less vitality to attend to this all-important work. The additional burden of keeping the living quarters clean could at small expense be assumed by the canner, with gratifying results in the general increase of cleanliness of the camp.

TOILETS.

As a general thing it was found that the toilet facilities provided for the foreigners in their living quarters at the cannery colonies were to be condemned as a menace to the health of those who had to use them, or to live near them. There were in the colonies 90 toilets for males, 93 for females, and 48 for both sexes. of these 204 were privies, and 7 were flush toilets with sewer connections. At 2 cannery labor camps the toilets were reported very clean, at 7 clean, at 14 dirty and at 5 filthy. Broken toilets were found to be very common, and often excrets lay on the seats and floors. In two places, the doors were off. In some cases the toilets were so dirty that they were no longer used.

A few cannery see to it that the deposits are removed weekly and the toilets thoroughly scrubbed and disinfected. One cannery had a concrete base built under the outhouse on which boxes were placed for the deposits, and each week these boxes were taken out and dumped. In the largest cannery colony state, three toilet buildings were provided. One part of these was for women and the other for men. In two of these the entrances were on the same side of the building, close together. No screen separated them. The newest one had the entrances on opposite sides of the building. In each building there were seven compartments for each sex, and all of these were newly whitewashed and found to be in very good condition. The deposits are taken from them three times a week.



INTERIOR AT ONE COLONY. COMPARATIVELY GOOD CONDITIONS.

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At most canneries, however, the condition of the toilets in the foreign colonies is a disgrace to the canners and a discredit to the industry.

CONDITION OF THE YARDS.

Owing to the inadequacy of the living quarters of the foreigners, the yard of the colony takes a very important place in the comfort of the workers. The yard is the place where the workers live when they do not go to their rooms to sleep, and is the playground of the children who are too small to work.

The great majority of the canners make no provision whatever for keeping the yards about their foreign quarters clean. At a few colonies it is permitted to throw garbage before the door, where flies swarm and where, on hot days, the stench is almost unbearable. One canner, when asked what provision he made for garbage disposal, said he didn't remember having heard of there being any. At some colonies barrels are provided for garbage, and it is disposed of periodically. A very few canners hire men to keep the yards clean. One kept two goats to serve as the cleaning squad.

The condition of the yard at the largest colony is a pleasant contrast to most others. Here a man was employed to clean up regularly, and there were at intervals faucets of water, with wide concrete bases, to prevent the development of mud holes.

WATER SUPPLY.

From a sanitary standpoint the water supply in large immigrant colonies is a most important consideration. Where food products are being packed extreme care should be taken to see that the workers are given every facility for keeping clean.

CONCLUSIONS.

While conditions of housing vary greatly in the different colonies, the following characteristics may be said to apply to the greater number:

1. That the buildings in which the imported laborers are housed are usually of flimsy construction.

2. That they are not designed with human understanding of the needs of the workers, but with the ever present aim to make the colonists available for work, with the smallest outlay of money possible.

3. That overcrowding and lack of privacy very often prevail.

4. That the buildings and yards are often insanitary, and that few cannery make efforts to keep them clean.

5. That the toilets are frequently very dirty.

6. That the water supply is often entirely adequate.

Surely these conditions are a discredit to the industry and to the men engaged in it. The Italians and Poles from overcrowded city tenements, instead of coming to fresh air and sunshine, as well they might, often come to over-crowded insanitary barracks, away from the supervision of any health authorities.

Cannery have organized these colonies for their own profit. Those of them who try to excuse these conditions on the ground that the workers are not accustomed to anything better, forget that in the large cities, from whence their workers are recruited, dwelling places are under the scrutiny of health authorities who have established a minimum standard of sanitation under which the house owner may not fall without incurring the penalty of a rigid health law. There seems to be no good reason why the owners of cannery tenements should be free from the obligations which State and city authorities impose upon tenement owners in cities. The feasibility of maintaining sanitary conditions has been demonstrated in more than one colony where the cannery has planned with humane consideration.

FINDINGS

THE FINDINGS ARE:

1. *Number of Child Workers.*

Large number of children, 1,355 under 16, of whom 952 were under 14 and 141 under 10, were found employed in New York State canneries during the summer of 1912.

2. *Law Observance.*

While individual canners are lax in obeying the Child Labor Law in the main parts of their factories, most of the canners observe it there.

3. *Child Workers in Sheds.*

One thousand two hundred and fifty-nine out of the 1,355 children found employed were employed in the cannery "sheds."

4. *Attorney-General's Ruling.*

These children were permitted to work as the result of a ruling of a former Attorney-General which, in effect, held that the cannery "sheds" were not a part of the factory.

5. *Character of Sheds.*

The following facts show the character of the 33 sheds where children worked:

Floors:

| | |
|---------------------|----|
| Floored | 24 |
| Unfloored | 9 |

Walls:

| | |
|-----------------------------|----|
| Entirely enclosed | 6 |
| One side open | 2 |
| Two sides open | 3 |
| Three sides open | 9 |
| All sides open | 13 |

Distance from process building:

| | |
|---------------------------------|----|
| Contiguous with it | 11 |
| Ten feet or less | 2 |
| Eleven to 25 feet | 9 |
| Twenty-six to 50 feet | 2 |

| | |
|--|---|
| One hundred and twenty-five to 300 feet..... | 4 |
| One-half mile | 4 |
| Two miles | 1 |

Connection with process building:

| | |
|--------------------------------------|----|
| No connection | 15 |
| Structural connection | 4 |
| Power connection | 7 |
| Structural and power connection..... | 11 |

Barrier to free passage of workers between shed and factory:

| | |
|------------------------|----|
| Actual barrier | 8 |
| No barriers | 20 |
| Distance barrier | 5 |

Artificial light:

| | |
|--------------------------------|----|
| Contain artificial light | 24 |
| No artificial light..... | 9 |

Machinery:

| | |
|--|----|
| Sheds containing machinery..... | 14 |
| Sheds containing machinery operated when children work | 8 |
| Sheds containing such, "dead" when children work | 6 |
| Sheds containing no machinery..... | 19 |

6. *Conditions of Labor.*

The light and ventilation in practically all of the sheds are excellent. The seats for workers are boxes with no backs.

7. *Work of Children.*

The work performed by children consists of snipping beans (breaking ends off the beans) and husking corn.

8. *Lifting and Carrying.*

At many factories the boys and girls from seven years up carry boxes of beans weighing from 3 to 29 pounds, averaging about 18 to 20 pounds, and crates of corn (carried

between two persons) weighing from 40 to 60 pounds. (In England the law prohibits the carrying of loads of more than 23 pounds by children under 16 years of age.)

9. *Duration of Period Children Work.*

The periods during which children work on beans varies from 10 to 80 days, with usually 14 to 42 days of consecutive daily work. The period during which work on corn lasts varies from 10 to 70 days, with usually 14 to 35 days of consecutive daily work. Where children are used on both beans and corn, the period during which they may work varies from 40 to 90 days, with 5 to 8 weeks of consecutive daily work.

10. *Hours of Work.*

Night work at many "sheds" is a frequent occurrence during the rush weeks on beans and corn. That at some factories during the rush, shed work with children employed begins at 4 or 4.30 A. M. That shed work is sometimes carried on Sunday, and for seven days a week.

11. *Canner Does Not Force Children to Work.*

As far as the canners are concerned, the children are free to work or not as they please.

12. *American Children.*

Where local American children are employed, they usually come and go at will.

13. *Foreign Children Forced to Work.*

Where Italian and Polish children are imported from the cities to work, as is the case at 40 per cent. of the factories employing children, they are often forced by their parents to work as long as the sheds are open for work, and that they do work for extremely long hours, sometimes from sunrise until 9 and 10 o'clock at night.

14. *Work After School Opens.*

Many of the factories employing children use them after the schools open, and a considerable number employ them during school hours.

15. *American Children's Schooling.*

In the case of the local American children, the work usually does not interfere with their schooling.

16. *Imported Foreign Children's Schooling.*

The schooling of the imported foreign children suffers seriously, approximately half either falling behind their classes or being conditioned. This is only partly due to the children's work in the sheds, arising from the general fact that the children are out of the cities while school is in session, and do not attend school in the cannery towns.

17. *Earnings of Children.*

The usual rate of pay for shed work is a penny a pound for snipping beans and three cents a bushel for husking corn. It is impossible to make a positive statement as to how much children can earn when paid by the piece work method, but the best estimate we can make from the earnings of individual children is:

Children under 10 will average 25 cents in 10 hours.

Children 10 to 14 will average 50 cents in 10 hours.

Children 14 to 16 will average 90 cents in 10 hours.

18. *Are Children Employed to Get Parent's Labor?*

Certain canners have claimed that they let the smaller children work only to get the labor of their parents, who cannot come to the factory without them. Of the 1,259 children under 16 found employed in the sheds, 754 alone to 505 who came with their parents. At one factory over 90 per cent. of the children came alone. Two canners have provided a room for the children of the parents who work in their factory, and hired a caretaker to look after them.

19. *Extent of Child Labor in the Industry.*

Half of the canners of beans in the State, including some of the largest packers, now employ no children for snipping; and two-thirds of the canners of corn, including again some of the largest packers, use no children for husking.

FINDINGS REGARDING HOURS AND WORK OF WOMEN AND MINORS

I. CONDITIONS OF LABOR.

1. *Speeding.*

That speeding is characteristic of many of the tasks at which women work in the canneries (putting on caps, inspecting, filling and weighing cans, etc.), due to machine pacing of labor, or to a piece work method of payment.

2. *Lighting.*

That the light was good or excellent where 1,059 out of 1,258 women (84 per cent.) worked. That in a few factories the lighting was poor, and that certain occupations (inspecting and sorting peas and beans) at which many women work involve eye-strain.

3. *Heat.*

That the heat was not excessive where 1,103 out of 1,231 women (89 per cent.) worked. That in a few occupations women are sometimes forced to work close to hot soldering irons, near steam cookers, or on steaming vegetables (filling cans, putting on caps, inspecting, etc.).

4. *Noise.*

That the noise was great where 577 out of 1,216 women (47 per cent.) worked. That certain occupations at which women are employed (sorting peas and beans at tables) are usually carried on amid a roar of machinery.

5. *Ventilation.*

That the ventilation was good where 1,025 out of 1,255 women (81 per cent.) worked. That in a few occupations women are often forced to work where the air is laden with steam (near cookers, peeling tomatoes, etc.).

6. *Wet Floors.*

That the floors were wet where 238 out of 1,224 women (10 per cent.) worked and that many of them were forced to work all day with wet feet.

7. *Seating.*

That 1,079 out of 1,232 women (95 per cent.) were provided with seats. That the seats in these cases were: Chairs, 245; stools, 460; benches, 156; boxes, 218. That 77 per cent. of the seats had no backs and many were of an inconvenient height for work. That certain factories do not provide seats for many of their women workers, and that at certain occupations most canners have their women workers stand (feeding corn cutters and peeling tomatoes).

8. *Lifting and Carrying.*

That 41 out of 1,219 women (3 per cent.) worked at occupations which required heavy lifting, and 34 out of 1,227 (2 per cent.) at occupations which required heavy carrying.

9. *Dangerous Machinery.*

That dangerous and unguarded machinery is very generally found throughout the industry.

II. THE CANNERY SEASON.

1. *Cannery Season.*

That the season when quickly perishable goods are canned lasts approximately from June 15 to October 15.

2. *Duration of Crops*

That the length of the period which each crop runs varies from year to year and from factory to factory, according to the weather conditions, varieties packed, etc. In 1911 the following variations were found in the length of the season for the three leading crops:

Peas — Season lasted 12 to 62 days.

Beans — Season lasted 11 to 92 days.

Corn — Season lasted 11 to 61 days.

3. *Rush Periods.*

That the number of days of rush on the three leading crops in different factories measured by the number of days when women worked over ten hours during the crop's duration were as follows:

Peas:

5 days or less, 6 factories.
6 to 10 days, 7 factories.
11 to 15 days, 9 factories.
16 to 20 days, 6 factories.
21 to 25 days, 7 factories.
26 to 30 days, 1 factory.
31 to 35 days, 1 factory.
36 to 38 days, 1 factory.

Beans:

5 days or less, 8 factories.
6 to 10 days, 1 factory.
11 to 15 days, 6 factories.
16 to 20 days, 3 factories.
21 to 25 days, 6 factories.
26 to 30 days, 1 factory.
31 to 35 days, 2 factories.
41 to 45 days, 1 factory.
70 to 72 days, 2 factories.

Corn:

5 days or less, 5 factories.
6 to 10 days, 3 factories.
11 to 15 days, 4 factories.
16 to 20 days, 6 factories.
21 to 25 days, 3 factories.
26 to 30 days, 4 factories.
31 to 35 days, 1 factory.
36 to 40 days, 1 factory.
74 days, 1 factory.

4. *Crop Overlapping.*

That sometimes the pea crop lasts till the bean crop begins, but that usually there is a let-down between the two crops when the factory canning both shuts down entirely or operates but a few hours per day. That the bean crop usually runs into the corn crop, sometimes causing an accentuated rush rather than a let-down.

III. HOURS OF LABOR.

1. *Periods of Rush and Let-down General in Industry.*

That every canner, whether he has attempted to restrict the hours of his women workers or not, has alternating periods when women work long hours per day and week and when they work short hours. In all cases the maximum hours worked per week are reached only during a few rush weeks scattered throughout the season.

2. *Fruits and Berries.*

That fruits and berries are not subject to such extreme periods of rush as vegetables, especially peas, and may be held in cold storage.

A considerable number of fruit and berry canneries, large and small, have obeyed the law fixing women's hours at 12 per day and 60 per week. On the other hand, other fruit and berry canneries have worked women overtime, one of these factories working a woman 21½ hours per day and 117½ hours per week.

3. *Vegetables.*

That vegetables, especially peas, are more subject to periods of rush than fruits and berries, and that, in this State, no method for preventing rapid deterioration of peas, beans and corn after harvesting has been proven practicable.

4. *Hours Per Day and Week.*

That in 1911 certain canneries worked women extreme hours per day and per week.

Hours Worked Longest Day:

13 canneries worked women 12 hours or less.
20 canneries worked women 12 to 14 hours.
19 canneries worked women 15 to 17 hours.
13 canneries worked women 18 hours or more.

Hours Worked Longest Week:

15 canneries worked women under 60 hours.
8 canneries worked women 61 to 66 hours.
6 canneries worked women 67 to 72 hours.
10 canneries worked women 73 to 79 hours.
11 canneries worked women 80 to 89 hours.
7 canneries worked women 90 to 99 hours.
3 canneries worked women over 100 hours.

5. *Housework.*

That approximately two-thirds of the women are housekeepers and that 61 out of 941 reported on do housework before and after their hours of labor in the factory.

6. *Distribution of Hours of Labor.*

That in many factories, on certain days and weeks, some of the women were found working extreme hours while others worked only a few hours.

7. *Overtime Labeling Cans.*

That at certain factories women were found working overtime at labeling cans where no perishable products were involved.

8. *Excessive Hours and Managerial Policy.*

That it has been found to be generally true that those factories working women extreme hours have so worked them year after year, while those keeping more moderate hours have kept such hours year in and year out.

8. *Excessive Hours and Managerial Policy — Con.:*

Six of the 13 factories which worked women over 18 hours on the longest day, and 5 of the 12 factories which worked women over 90 hours on their longest week, however, none of these companies have succeeded in eliminating overtime.

9. *Regulation of Planting and Harvesting.*

No system of planting and harvesting has yet been put into practice in New York State which has prevented alternating rush and let-down periods, due to sudden ripening of crops.

10. *Adjustment of Acreage to Capacity of Plant.*

In the spring every vegetable canner contracts for the product of a certain acreage. He knows approximately what acreage will yield if a full crop is returned. He knows also the exact capacity of his factory when operated for a given number of hours. Some canners do not adjust their acreage to the capacity of their plants so that in rush weeks they cannot handle their crop without extreme overtime. Canners working long hours were found to carry a larger acreage in comparison to their capacity (as measured by their capping machines) than those working more moderate hours.

IV. COMPETITION UNDER CANNERY EXEMPTION.

1. *Unequal Competition Under Complete Cannery Exemption.*

That the present law, which grants the canners a complete exemption from the law restricting the hours of women, gives those canners who are willing to work extreme hours an advantage over their competitors who are ^willing to so work women.

1. *Unequal Competition Under Complete Cannery Exemption — Continued:*

Those cannery who keep moderate hours carry a smaller acreage in relation to their capacity than their competitors.

A few factories which have kept moderate hours have replaced women with men for overtime work, paying them for such work more than half as much again as their competitors have paid women.

V. TIME BOOKS.

1. *Falsified Time Books.*

That certain cannery who knowingly violate the 60-hour law falsified their time books to show apparent compliance with its provisions.

2. *No Records of Hours on Piece Work.*

That many cannery working women both on time work and piece work keep a record only of the hours worked on time so that their books do not show the actual hours of work.

VI. NO REAL PROTECTION GIVEN TO WOMEN BY LAW RESTRICTING THEIR HOURS.

1. *Protection Not Given by Law.*

That the law restricting the hours of women to 12 per day and 60 per week gave no real protection to the women in the canning industry because it was not enforced.

In 1908 the Labor Department made an effort to enforce the law in the canneries instituting a large number of prosecutions for violation. In every case except where the defendant pleaded guilty the result was either a dismissal by judge or acquittal by jury.

The present investigation discovered one small vegetable cannery packing peas, a few one line

1. *Protection Not Given by Law — Continued:*

corn canneries, and a number of fruit and berry canneries in which the hours never exceeded 12 per day and 60 per week. All other factories worked women beyond the hours the law permitted. Only two of the larger companies restricted their hours because of the law and neither of them strictly obeyed its provisions.

VII. WAGES OF WOMEN.

1. *Wages.*

That the wages of women in the canning industry range from 7 to 15 cents an hour, the majority getting 10 cents. That piece work rates are usually adjusted so that the slowest women make a little less than on time work while the fastest women make a great deal more.

2. *Overtime Pay.*

That women are paid for overtime work, but not at an increased rate. That in but one factory, and then only occasionally, are women paid extra rates for Sunday or holiday work.

FINDINGS REGARDING SANITATION AND HOUSING

1. *Sanitary Conditions in Factory Processes:*

That the sanitary conditions in the canning processes are usually excellent.

2. *Washing Facilities:*

That most factories do not provide adequate facilities for the employees to wash their hands before handling the materials. Only 29 out of 99 factories reported on being satisfactorily provided in this respect.

3. *Toilets:*

That 39 out of 89 toilets for females were reported as dirty, and that 29 out of 92 for males were reported as dirty.

4. *Housing of Foreigners:*

That the tenements, barracks and shanties where the foreigners imported from the cities are housed by the canners are often overcrowded, without proper privacy, and in a decidedly insanitary condition. In 17 out of 37 cases the buildings themselves were reported as dirty; in 20 out of 39 cases the yards were reported dirty. In but 6 out of 36 cases was anyone hired to keep the premises in a sanitary condition. In certain cases the water supply for these camps was totally inadequate to the promotion of cleanliness. In 30 out of 42 cases the camp toilets were reported as dirty. In some cases doors were off and in others the toilets were so filthy they were no longer used.

APPENDIX TABLES

APPENDIX TABLE NO. I.

NEW YORK STATE CANNERIES AND THE PRODUCTS THEY PACK.

| TOWN
OR
CITY. | Title of Company. | Products Packed. |
|----------------------|--------------------------------|--|
| Adams..... | Fred L. Webster..... | Spinach. |
| Akron..... | Hamburg Canning Co..... | Peas and corn. |
| Albion..... | Burt Olney Canning Co..... | Peas, beans, tomatoes, corn, catsup. |
| Allegheny..... | Franklinville Canning Co..... | Peas, beans, corn, apples, pumpkin. |
| Auburn..... | H. C. Hemingway Co..... | Peas, beans, corn, rhubarb, apples, lima beans, red kidney beans. |
| Barker..... | Springville Canning Co..... | Cherries, plums, peas, beans, tomatoes, peaches, pears, apples. |
| Barre Center..... | Orleans County Canning Co..... | Peas, tomatoes, apples. |
| Batavia..... | Batavia Preserving Co..... | Peas, beans, spinach. |
| Blossvale..... | Blossvale Canning Co..... | Corn. |
| Brockport..... | Hudson & Co..... | Strawberries, blackberries, raspberries, cherries, currants, beans, tomatoes, peaches, apples, gooseberries. |
| Brockport..... | Monroe County Canning Co..... | Strawberries, blackberries, raspberries, cherries, currants, plums, tomatoes, peaches, pears, apples. |
| Camden..... | Camden Packing Co..... | Corn. |
| Camden..... | L. P. Haviland Co..... | Beans, corn, pumpkin, squash. |
| Canandaigua..... | Cobb Preserving Co..... | Raspberries, peas, corn. |
| Canastota..... | Canastota Canning Co..... | Peas, beans, corn. |
| Canastota..... | F. F. Hubbard..... | Peas, tomatoes, corn, apples, pumpkin, squash. |
| Canajoharie..... | Beech Nut Packing Co..... | Preserves. |
| Cazenovia..... | Cazenovia Canning Co..... | Peas, beans, corn, pumpkin. |
| Cherry Creek..... | Cherry Creek Canning Co..... | Strawberries, peas, beans, corn, beets, apples. |
| Chittenango..... | Merrell-Soule Co..... | Peas, corn. |
| Cicero..... | Sadler Canning Co..... | Corn. |
| Clay..... | The J. Weller Co..... | Tomatoes, pumpkin. |
| Cleveland..... | Will & Sixbury..... | Beans, tomatoes, corn. |
| Clinton..... | Clinton Canning Co..... | Peas, beans, corn, apples, pumpkin, squash. |
| Clyde..... | H. C. Hemingway Co..... | Peas, beans, corn, pumpkin. |
| Constantia..... | H. D. Scoville..... | Corn. |
| Cortland..... | Yager & Halsted..... | Peas, beans. |
| Cohocton..... | Cohocton Canning Co..... | Strawberries, raspberries, peas, beans, corn, apples. |
| Eagle Harbor..... | Cole & Hitchcock..... | Tomatoes, beets, apples. |
| East Pembroke..... | East Pembroke Canning Co..... | Raspberries, blackberries, cherries, peas, beans, tomatoes, corn, pears, spinach, beets, apples, pumpkin. |
| East Williamson..... | Fruit Belt Preserving Co..... | Strawberries, raspberries, blackberries, cherries, currants, plums, beans, peaches, pears, spinach, beets, apples. |
| Eden Center..... | Hamburg Canning Co..... | Peas, beans, tomatoes, apples. |
| Egypt..... | Egypt Canning Co..... | Strawberries, raspberries, cherries, plums, tomatoes, rhubarb, apples. |
| Fabius..... | J. P. Dorrance Co..... | Corn. |
| Fancher..... | Rice Bros..... | Tomatoes, apples. |
| Fairport..... | Cobb Preserving Co..... | Strawberries, raspberries, cherries, currants, plums, peas, beans, tomatoes, peaches, pears, apples. |
| Farnham..... | Fort Stanwix Co..... | Strawberries, raspberries, blackberries, cherries, peas, beans, tomatoes, corn, pears, spinach, beets, apples, pumpkin, squash, lima beans, red kidney beans. |
| Fayetteville..... | Merrell-Soule Co..... | Peas, corn. |
| Forestville..... | Haserot Canneries Co..... | Peas, beans, corn. |
| Franklinville..... | Franklinville Canning Co..... | Peas, beans, corn, apples. |
| Fredonia..... | Fredonia Preserving Co..... | Strawberries, raspberries, blackberries, cherries, plums, peas, beans, tomatoes, corn, spinach, beets, apples. |
| Frewsburg..... | Frewsburg Canning Co..... | Corn, peas. |
| Geneseo..... | Geneseo Jam Kitchen..... | Strawberries, raspberries, blackberries, cherries, currants, plums, peas, beans, corn, tomatoes, peaches, pears, rhubarb, spinach, beets, apples, asparagus, pumpkin, apricots, gooseberries, pineapple, red kidney beans, lima beans. |

APPENDIX TABLE NO. I.—Continued.

| TOWN
OR
CITY. | Title of Company. | Products Packed. |
|----------------------|----------------------------------|--|
| Geneva..... | Geneva Preserving Co. | Strawberries, raspberries, blackberries, cherries, currants, plums, peas, beans, corn, peaches, pears, rhubarb, spinach, beets, apples, asparagus, pumpkin, apricots, gooseberries, pineapple, red kidney beans, lima beans. |
| Gowanda..... | Haserot Canneries..... | Strawberries, raspberries, blackberries, peas, beans, corn, apples, pumpkin. |
| Hamburg..... | Hamburg Canning Co..... | Peas, beans, tomatoes. |
| Hamilton..... | Lee Canning Co..... | Peas, beans, corn, pumpkin. |
| Harbor..... | Utica Canning Co..... | Corn. |
| Hemlock..... | Hemlock Canning Co..... | Peas, corn. |
| Highland..... | A. B. Merritt..... | Tomatoes. |
| Highland..... | Highland Orchards Co..... | Strawberries, raspberries, blackberries, peaches, tomatoes, apples, pears. |
| Hilton..... | Peck and Pratt..... | Peas, tomatoes, corn, apples. |
| Holcomb..... | Egypt Canning Co..... | New in 1912. |
| Holley..... | Hudson & Co..... | Peas, beans, tomatoes, apples. |
| Interlachen..... | Yager & Halsted..... | Corn. |
| Irving..... | Fort Stanwix Canning Co..... | Used as Viner Station in 1912. |
| Kenwood..... | Oneida Community Ltd..... | Strawberries, raspberries, blackberries, cherries, currants, plums, beans, tomatoes, corn, peaches, pears, rhubarb, beets, apples, asparagus, pumpkins, huckleberries, red kidney beans. |
| Kirkland..... | Fort Stanwix Canning Co. leased. | Peas. |
| Knoxboro..... | Knoxboro Canning Co..... | Corn. |
| Lee..... | Lee Canning Co..... | Corn. |
| Lee Center..... | Olney & Floyd..... | Peas, beans, corn. |
| Leonardsville..... | Utica Canning Co..... | Peas, corn. |
| Le Roy..... | Le Roy Canning Co..... | Peas, beans, corn, pumpkin. |
| Lockport..... | Lockport Canning Co..... | Cherries, plums, tomatoes, apples. |
| Lockport..... | Pusatari Co..... | Tomatoes. |
| Lyndonville..... | Lyndonville Canning Co..... | Raspberries, cherries, currants, plums, tomatoes, apples. |
| Lyons..... | H. C. Hemingway..... | Peas, beans, corn. |
| McConnellsville..... | Tuttle & Co..... | Corn, pumpkin. |
| Manlius..... | O. H. Perry & Son..... | Strawberries, raspberries, blackberries, cherries, plums, tomatoes, pears, rhubarb, beets, apples, asparagus, pumpkin, squash, gooseberries. |
| Marion..... | J. B. Malcolm Co..... | Strawberries, raspberries, blackberries, cherries, peas, beans, peaches, pears, rhubarb, apples, currants. |
| Marion..... | Wayne County Canning Co..... | Strawberries, raspberries, blackberries, cherries, peas, beans, corn, peaches, pears, rhubarb, spinach, beets, apples. |
| Mattituck..... | Hudson & Co..... | Tomatoes, asparagus. |
| Medina..... | Burt Olney Canning Co..... | Strawberries, raspberries, blackberries, cherries, plums, peaches, pears, apples. |
| Mexico..... | Wilson Canning Co..... | Strawberries, raspberries, blackberries, cherries, plums, tomatoes, peaches, pears, rhubarb, apples, quinces, crab-apples, pork and beans, plum puddings. |
| Middleport..... | Batavia Preserving Co..... | Tomatoes, apples. |
| Model City..... | Fredonia Preserving Co..... | Raspberries, blackberries, cherries, currants, plums, tomatoes, peaches, pears, apples, gooseberries. |
| Morton..... | Morton Canning Co..... | Peas, beans, tomatoes, corn, spinach, beets, apples, pumpkin, squash. |
| Mt. Morris..... | Winters & Prophet..... | Peas, beans, tomatoes, corn, spinach, beets, pumpkin, squash. |
| Mt. Morris..... | John F. White Co..... | Strawberries, raspberries, blackberries, cherries, currants, plums, peas, beans, tomatoes, corn, peaches, pears, rhubarb, spinach, beets, apples, asparagus, pumpkin, squash. |
| Newark..... | Edgett-Burnham Co..... | Strawberries, raspberries, blackberries, beans, tomatoes, rhubarb, beets. |
| Newburg..... | Warford Canning Co..... | Plums, tomatoes. |
| Newfane..... | Kruikshank Bros..... | Peas. |
| New Hartford..... | New Hartford Canning Co..... | Corn. |
| Newport..... | New Hartford Canning Co..... | Corn. |
| North Bay..... | H. R. Phelps..... | Beans, corn. |

APPENDIX TABLE NO. I.—*Concluded.*

| TOWN
OR
CITY. | Title of Company. | Products Packed. |
|---------------------|---|--|
| North Rose..... | Baker Co..... | Strawberries, raspberries, blackberries,
plums, tomatoes, peaches, pears, apples. |
| North Rose..... | Salter Co..... | Strawberries, raspberries, blackberries,
cherries, plums, beans, tomatoes,
peaches, pears, spinach, beets, apples. |
| Oakfield..... | A. J. Tanner & Co..... | Strawberries, raspberries, blackberries,
cherries, peas, beans, tomatoes, pears,
spinach, beets, apples, pumpkin,
squash, quinces. |
| Oneida..... | Burt Olney Canning Co..... | Peas, beans, corn, pumpkin, pork and beans. |
| Oswego..... | Oswego Preserving Co..... | Strawberries, raspberries, cherries, peas,
beans, corn, pears, apples, red kid-
ney beans, lima beans. |
| Parish..... | C. A. Windholz..... | Corn. |
| Pennellville..... | J. P. Dorrance Canning Co..... | Peas, corn. |
| Penn Yan..... | Yates County Canning Co..... | Strawberries, raspberries, blackberries,
cherries, currants, plums, beans, to-
matoes, peaches, pears, rhubarb,
beets, apples, gooseberries, quinces. |
| Poughkeepsie..... | R. U. Delapena & Co..... | Cherries, pineapple, and preserves. |
| Richland..... | Pulaaki Canning Co..... | Corn. |
| Rochester..... | Curtice Bros..... | Strawberries, raspberries, blackberries,
cherries, currants, plums, peas, beans,
peaches, pears, apples, catsup. |
| Rochester..... | W. N. Clark..... | Strawberries, raspberries, blackberries,
cherries, currants, plums, peaches,
pears, rhubarb, beets, apples. |
| Rochester..... | American Fruit Products Co..... | Strawberries, raspberries, blackberries,
cherries, currants, plums, peaches,
pears, rhubarb, apples. |
| Rome..... | Fort Stanwix Co..... | Peas, beans, corn, pumpkin, squash. |
| Rush..... | Wilson Canning Co..... | Peas, beans, corn. |
| Sauquoit..... | A. R. Hatfield..... | Peas. |
| Sherman..... | North East Preserving Works..... | Corn. |
| Silver Creek..... | Fredonia Preserving Co..... | Strawberries, raspberries, blackberries,
cherries, plums, peas, beans, tomatoes,
spinach, beets, apples. |
| Sodus..... | Sodus Canning Co..... | Strawberries, raspberries, blackberries,
cherries, plums, currants, peaches,
pears, apples. |
| South Dayton..... | Fuller Canneries..... | Peas, beans, tomatoes, corn, beets. |
| Springville..... | Springville Canning Co..... | Peas, beans, corn, beets, apples, pumpkin. |
| Stacy's Basin..... | Empire State Canning Co..... | Peas, beans, corn, pumpkin, squash. |
| Stittville..... | Stittville Canning Co..... | Peas, beans, corn, beets, pumpkin. |
| Stormville..... | William T. Storm..... | Tomatoes, apples. |
| Syracuse..... | Merrell-Soule..... | Mince meat, etc. |
| Syracuse..... | H. C. Hemingway Co..... | Tomatoes. |
| Syracuse..... | New Hartford Canning Co..... | Peas, beans, tomatoes. |
| Syracuse..... | Ford Bros..... | Cherries, tomatoes, spinach, asparagus. |
| Taberg..... | Wilson Co..... | Corn. |
| Turin..... | Turin Canning & Pickling Co..... | Peas, beans, corn, beets, spinach, red
kidney beans, lima beans, pumpkin. |
| Verona..... | Oneida County Canning Co..... | Corn. |
| Vernon..... | Curtice Bros. Co..... | Peas, corn, beets. |
| Victor..... | Victor Preserving Co..... | Strawberries, raspberries, blackberries,
cherries, plums, beans, tomatoes,
peaches, pears, rhubarb, apples. |
| Waterkoo..... | Geneva Preserving Co..... | Strawberries, raspberries, cherries, cur-
rants, plums, peas, beans, corn,
peaches, rhubarb, apples, elderberries. |
| Waterville..... | Fort Stanwix Canning Co. leased. | Peas. |
| Wayland..... | Wayland Canning Co..... | Peas, beans, corn, spinach, apples. |
| Webster..... | Webster Canning & Preserving
Co..... | Strawberries, raspberries, blackberries,
cherries, plums, pears, apples, pineapple. |
| Westernville..... | Mohawk Valley Canning Co..... | Corn, peas, beans, pumpkin, squash. |
| Whitesboro..... | Fort Stanwix Canning Co. leased. | Corn. |
| Williamson..... | K. M. Davies & Co..... | Strawberries, raspberries, cherries,
plums, beans, peaches, pears, spin-
ach, beets, apples. |
| Williamstown..... | New Hartford Canning Co..... | Corn. |
| Wilson..... | Fredonia Preserving Co..... | Cherries, plums, peas, beans, tomatoes,
corn, beets, apples, pumpkin, squash. |
| Wolcott..... | Twitchell-Champlin Co..... | Strawberries, raspberries, plums, peas,
beans, apples. |
| Wyoming..... | Wyoming Canning Co..... | Peas. |

APPENDIX TABLE NO. II.

CHILD LABOR LAWS APPLYING TO THE CANNERIES IN THE FIFTEEN LEADING CANNERY STATES.

| STATE. | Age Limit. | Hours of Labor. |
|-----------------|--|--|
| California..... | 12 year age limit with certificate during school vacation. 15 year limit rest of year. | No restriction except that no minor under 18 may be employed between 10 P. M. and 5 A. M. Exemption from 48 hour law for females. |
| Delaware..... | No restriction. Exemption from 14 hour limit. | 9 hour day; 54 hour week for children under 16. Night work prohibited for children under 16; 6 P. M. to 7 A. M. |
| Georgia..... | 12 year limit. With exemption of orphan, or child of parents without other means of support; employment for 1 year with certificate. | Night work prohibited for children under 14; 7 P. M. to 6 A. M. |
| Illinois..... | 14 years..... | 8 hours a day; 48 hours a week, for children under 16. Night work prohibited for children under 16; 7 P. M. to 7 A. M. |
| Indiana..... | 12 years. From June 1st to October 1st exemption from 14 year limit. | 8 hours a day; 48 hours a week. 9 hours a day; 54 hours a week, with consent of parents. Night work prohibited for children under 16; 6 P. M. to 7 A. M. |
| Iowa..... | 14 years..... | Cannery exemption from law restricting hours of children under 16 to 60 per week in places connected with factory where no machinery is operated; otherwise 60 hours a week. Night work prohibited for children under 16; 9 P. M. to 6 A. M. |
| Maine..... | 14 years..... | Cannery exemption from 58 hour law for boys under 16 and girls under 18 (except in sardine canneries). |
| Maryland..... | 12 years..... | 10 hours a day for children under 16. |
| Michigan..... | 14 years..... | Cannery exemption from 54 hour law for children under 16. |
| Missouri..... | 14 years..... | 8 hours a day; 48 hours a week, for children under 16. Night work prohibited under 16 years; 7 P. M. to 7 A. M. |
| New Jersey.... | 14 years..... | Females exempt from 60 hour week law. |
| Ohio..... | 14 years..... | 8 hours a day; 48 hours a week, for boys under 16; girls under 18. Night work prohibited for them; 6 P. M. to 7 A. M. |
| Pennsylvania.. | 14 years..... | 10 hours a day; 58 hours a week, children under 16. Night work prohibited for boys under 16, girls under 18; 9 P. M. to 6 A. M. |
| Tennessee..... | 14 years..... | 60 hours a week for children under 16. |
| Wisconsin..... | 14 years. 12 years during vacation, where child resides; with employment permit. | For all females 10 hours a day; 55 a week unless work is done after 8 P. M. or before 6 A. M. on more than 1 day in a week in which case the limitation is 8 hours in every 24. |

APPENDIX TABLE NO. III.

LAWS RESTRICTING HOURS OF WOMEN IN LEADING CANNERY STATES.

| STATE. | Hours of Labor for Women 16 years old and over, working in Canneries. |
|-------------------|---|
| California..... | Cannery exemption from 48 hour law. |
| Delaware..... | No restriction on hours of women. |
| Georgia..... | No restriction on hours of women. |
| Illinois..... | 10 hours a day. |
| Indiana..... | No female under 18 years to be employed more than 60 hours in one week or 10 hours in one day. No night work for females. |
| Ohio..... | Cannery exemption from 54 hour law. |
| Tennessee..... | 60 hours a week. |
| Wisconsin..... | 10 hours in 24; 55 a week for females unless work is done after 8 P. M. and before 6 A. M. more than one day a week, in which case the limitation is 8 hours in every 24. |
| Iowa..... | No restriction on hours of women. |
| Maine..... | Cannery exemption from 58 hour law, except in sardine canneries. |
| Maryland..... | Cannery exemption from 60 hour a week law for females. |
| Michigan..... | Cannery exemption from 54 hour law. |
| Missouri..... | 9 hours a day; 54 hours a week, for all females. No work between 10 P. M. and 5 A. M. |
| New Jersey..... | Females exempt from 60 hour law. |
| Pennsylvania..... | 12 hours a day; 60 a week. |
| Virginia..... | 10 hours a day. Cannery exemption between July 1st and November 1st. |

APPENDIX TABLE NO. IV.

LAWS REGULATING THE EMPLOYMENT OF WOMEN AND CHILDREN IN CANNERIES
IN FOREIGN COUNTRIES.

GREAT BRITAIN.

CHILD LABOR:

Age:

No child under 12 years of age may be employed.

Children of 13 may work as "young persons" (persons between the age of 14 and 16) if they hold an employment certificate.

Hours:

Children from 12 to 14 years may be employed but only for half time; that is for sixty hours a fortnight, during which they must work either on alternate days or under the morning and afternoon "set" system.

The alternate day system must begin at 6 to 8 a. m. and end at 6 to 8 p. m. The morning "set" shall begin at 6 to 6 a. m. and end at 1 p. m. The afternoon "set" shall begin at 1 p. m. and end at 2 to 4 p. m. On Saturdays Night work for children is prohibited between the hours of 8 p. m. and 6 a. m.

Work on Sundays is prohibited.

HOURS OF WOMEN:

The Secretary of State is given authority to grant any factory packing perishable goods a special exemption from the law restricting the hours of women and young persons in other factories, if he is satisfied that it may be done without endangering their health. This exemption does not, however, completely exempt them but places them under the following restrictions:

HOURS OF WOMEN — *Continued*:

No woman or young person shall be employed before 6 in the morning or after 10 in the evening. In the case of young persons a period of not less than 10 hours shall elapse between days of works.

No woman or young person shall be employed continuously for more than 5 hours without an interval of at least half an hour. There shall be an interval of one hour at least either at the same or different times before 3 o'clock in the afternoon.

In accordance with his powers the Secretary of State has granted the fruit preservers a special exemption placing them under these regulations. In doing so, however, he issued special orders to insure that the working conditions in these factories be kept in the best possible shape. These orders were as follows:

SPECIAL REGULATION FOR FRUIT PRESERVING:

1. "There shall be sufficient and suitable sanitary accommodation for the use of all persons employed, as defined in the Special Order made by the Secretary of State under Section 9 of the Factory and Workshop Act, 1901."
2. "There shall be sufficient and suitable washing accommodation for the use of all persons employed in cleaning or preparing fruit."
3. "In each room in which women or young persons are employed in pursuance of the special exception:
 - (a) There shall be not less than 400 cubic feet of air space for each person employed in the room.
 - (b) If any process is carried on which entails the giving of steam, a fan or other efficient means shall be maintained and used for the removal of steam at or near the point of origin.
 - (c) A thermometer shall be kept fixed.

SPECIAL REGULATION FOR FRUIT PRESERVING — *Continued*:

- (d) The floors shall be kept in good condition; and if any wet process is carried on so drained as to carry the wet away from the workers.
 - (e) The walls and ceilings shall once in every six months be lime-washed or, if the surface be such as not to admit of lime washing, washed.
 - (f) There shall be adequate lighting."
4. "No woman or young person shall be employed in pursuance of the special exception unless and until the occupier holds certificate from the Inspector of the district, to the effect that provision has been made to his satisfaction for compliance with the foregoing requirements of this Order, for the maintenance of reasonable temperature, and for ventilation."

FRANCE.

CHILD LABOR:

Age:

No child under 12 years may be employed, and then only with an educational and medical certificate.

Hours:

Children under 16 years may not work more than 10 hours a day; children from 16 to 18 may not work more than 11 hours a day, or 60 hours a week.

Night work is prohibited for children under 18 between the hours of 9 a. m. and 5 a. m. and work on Sundays and legal holidays is prohibited.

HOURS OF WOMEN:

No woman over 18 may be employed at actual labor for more than 11 hours per day with an interval or intervals of at least one hour.

No woman may be employed at night between 9 p. m. and 5 a. m.

The Government has a right to exempt certain industries or to designate those in which women over 18 may work until 11 p. m. at certain times during the year.

GERMANY.

CHILD LABOR:

Age:

No child under 13 years may be employed.

Hours of Labor:

Children under 14 years may not work more than 6 hours a day with an intermission of one-half hour. Children under 16 years may not work more than 10 hours a day with intervals of one hour at mid-day and one-half hour in the morning and afternoon.

Night work is prohibited for children under 16 years.

Sunday work is prohibited for children under 16.

HOURS OF WOMEN:

A special exemption is granted to the canneries. In preserving factories women over 16 years may be employed on those days other than Saturdays and days preceding holidays for not more than 13 hours a day and not between the hours of 10 p. m. and 5.30 a. m. When the normal work day period of 11 hours is exceeded on more than 40 days during the industrial year (May 1st to April 30) the average duration of daily labor must not exceed the normal work day.

On Saturdays and the days preceding holidays women may not be employed for more than 10 hours.

Women must be given one hour for rest in the middle of the day and women over 16 who have household duties to perform must on request be dismissed half an hour before the noon intermission, when the latter is not at least one and a half hours long.

AUSTRIA.

CHILD LABOR:

Age:

No children under 12 years may be employed.

CHILD LABOR — *Continued*:*Hours:*

The work of children from 12 to 14 years must not exceed 8 hours in one day.

In preserving factories children from 14 to 16 years may work at night when the operation in which they are engaged cannot be postponed without danger that the articles might be spoiled.

HOURS OF WOMEN:

No woman may be employed more than 11 hours a day, nor between the hours of 8 p. m. or 5 a. m.

In preserving factories women may be employed at night under the same conditions as children.

ONTARIO.

CHILD LABOR:

Age:

No child under 14 years of age allowed to work in factory.

Outside of factory children of any age may be employed preparing fruits or vegetables during June, July, August, September and October.

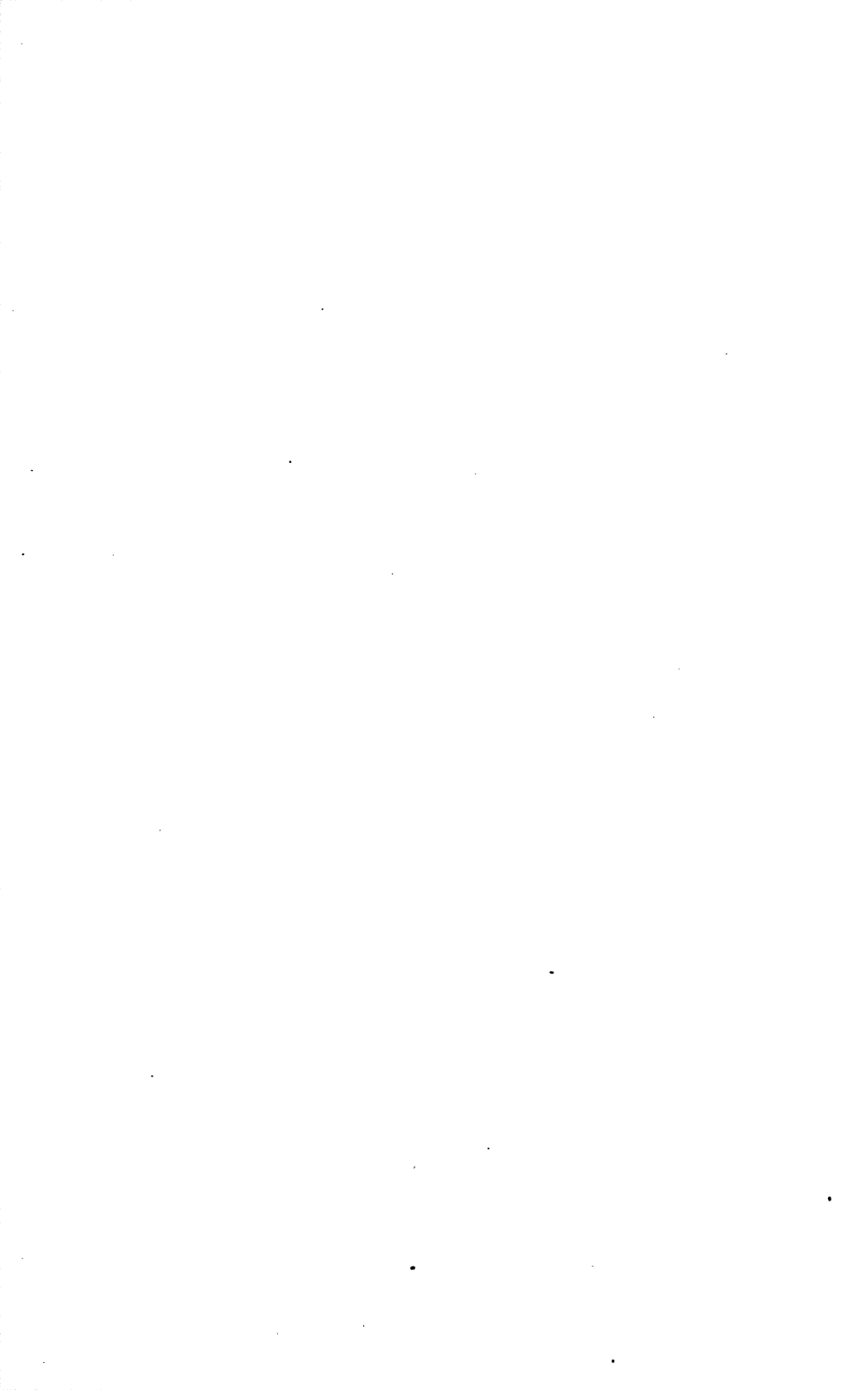
Hours:

The work of children under 16 years, and young girls under 18 is not to exceed 10 hours in one day and 60 hours in one week, with one hour daily for meal time. They must not work between the hours of 7 p. m. and 7 a. m.

HOURS OF WOMEN:

The work of women is not to exceed 10 hours in one day, or 60 hours in one week, with one hour daily for meal time. They must not work between the hours of 7 p. m. and 7 a. m.

During the months of July, August, September and October, women may be employed to a later hour than 9 p. m. in the canning industry, but not for more than 20 days in the whole.



APPENDIX VI

WOOD ALCOHOL:

A REPORT ON THE CHEMISTRY, TECHNOLOGY AND
PHARMACOLOGY OF AND THE LEGISLATION
PERTAINING TO METHYL ALCOHOL,

BY

CHARLES BASKERVILLE, *Ph. D., F. C. S.,*
Professor of Chemistry

AND

Director of the Laboratory

IN THE

College of the City of New York

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PREFACE

Nearly a thousand cases of poisoning attributed to wood alcohol have been reported in the literature since 1899. That time marked the advent of such preparations as "Columbian spirits," "Colonial spirits," etc., that is to say, methyl alcohol of a high grade of purity. In 1906, due to a general agitation for a tax-free denatured ethyl alcohol, hearings were held before the Ways and Means and Finance Committees of the Federal Congress. The deleterious action of wood alcohol on the general health and eyesight of the working people handling it in the industries was strongly emphasized by manufacturers, working people and experts at these hearings. The actual number of cases of poisoning by wood alcohol and the extent of the poisoning will probably never be known, as the practitioner, having a clearly defined case, no doubt notes the fact in his private records, but, unless it presents some novel features of scientific interest, makes no publication of the fact. However, even since 1906, there has been a steadily increasing number of cases of poisoning by methyl alcohol reported in the scientific journals. The recognition of this fact alone warranted an investigation of the conditions in the State of New York, a work independently begun by several organizations, among them the Committee for the Prevention of Blindness in the Association for the Blind. An inspection of works where wood alcohol is made or used in the arts by Dr. George M. Price and Dr. F. E. Breithut, whom I assigned as chemical advisor to the inspectors, emphasized the necessity for providing precautionary measures to abate the evil. A study of the whole problem, especially the legislation concerned therewith, made by me, substantiated the need of further legislation.

In making the recommendations given in Chapter VII. of the report, I held constantly in mind two basic principles: first, progress in civilization has involved the multiplication of dangers and devising means to safeguard them; and, second, legitimate manufacturing has some rights which should be respected. Makers and users of chemicals, especially the former, are ready to co-operate in any reasonable way for the welfare of the com-

munity, even if it entail some financial outlay. The changes proposed in the present laws are reasonable. They involve, first, ample ventilation; second, proper labelling; and, third, removal of the ambiguity of the present law.

The sum of \$600 was placed at my disposal for the preparation of this report. Two hundred dollars were paid Dr. F. E. Breithut for services referred to above, and the balance was paid my private assistants, Messrs. W. A. Hamor and Jacob Feldbaum, for bibliographic work. The typewriting was done by my secretary, provided by the College of the City of New York, and my own services have been gratuitous.

• CHAS. BASKERVILLE.

COLLEGE OF THE CITY OF NEW YORK,

December 2, 1912.

CHAPTER I

WOOD ALCOHOL: WHAT IT IS.

Early History.

Although methyl alcohol was discovered by Robert Boyle (1) in 1661, Philip Taylor (2) is regarded by most authorities as the discoverer of the compound. In 1812, Taylor obtained it in attempting to purify pyroligneous acid by a new process; he thought it was a new variety of ether and called it "pyroligneous aether." The constitution of methyl alcohol and its analogy to ethyl alcohol was established by Dumas and Peligot (3) in 1835; they named the compound methyl alcohol, from μέθυ, wine; ἄλγ, wood.

*Wood Spirit is a Complex Mixture.**Deodorized Wood Alcohol.*

That "wood-spirit" is not a simple compound, but contains different bodies was suggested by Berzelius (4) in 1839. This supposition was soon confirmed by Scanlin (5), Gmelin (6), Weidmann and Schweizer (7), and Cahours (8). Later, Dancer (9) and Grodski and Kraemer (10) determined the impurities in commercial wood alcohol, and devised methods for their elimination. Methods for the preparation of pure methyl alcohol were also devised by Regnault and Villejean (11), Wohler (12) and Lieben (13). Nevertheless, the commercial wood alcohol on the market in 1896 (14) was the same vile-smelling, greenish yellow, nauseous liquid as in 1850, and only quite recently was the deodorized product (15) placed upon the market.

(1) "Opera," 3, 385.

Boyle speaks of a "natural" or "adiaphorous" spirit obtained by distilling the liquor afforded by wood.

(2) Phil. Mag., 60, 315 (1822).

(3) J. prakt. Chem., 3, 7, 369; Pharm. Centr., 6, 279.

(4) Ann., 73, 213.

(5) Jahresber., 15, 378 (1837).

(6) Ann., 19, 283 (1837).

(7) Ide n., 25, 47 (1838).

(8) Pogg. Ann. 43, 593 (1838).

(9) Compt. rend., 30, 319 (1850).

(10) Ann., 152, 240.

(11) Idem, 1870, 317.

(12) Ber., 7, 1492; 9, 1920 (1874).

(13) Ann., 81, 376.

(14) See Wood, N. Y. Med. J., Jan. 7, 1906, 5.

(15) Sold as "Columbian spirits," "Eagle spirits," "Colonial spirits," "Manhattan spirits," "Union spirits," "Lion d'or," "green wood spirits," "Standard wood spirits," and the newest variety (1912) "pro spirit."

Methyl Alcohol Occurs in the Distillate from Plants.

It is doubtful whether methyl alcohol occurs in the free state in nature, although the methyl salts are contained in a variety of plants. Thus, methyl alcohol is contained in the *steam distillate* from meadow grass (16), in the distillation water from oil of cloves (17), from oil of caraway (18), from vetivier oil (19), from the oil of the fruit of *Heracleum giganteum* (20), and from the oil of tea from leaves of *Thea Chinesis* (21).

Methyl alcohol occurs also in the water distillate from the unripe fruit of *Anthriscus cerefolium* (22), from the oil obtained by distilling the leaves of *Indigofera galeoides* (23), from the oil of bay (24), and in the steam distillate from the root of *Acorus calamus* (25). According to Wolff (26), methyl alcohol is also found in the fermented juice of fruit, such as currants, plums, apples, cherries, grapes, etc.

Esters of Methyl Alcohol Occur in Volatile Plant Oils.

Methyl esters occur very frequently in volatile plant oils. Thus, methyl salicylate occurs in many plants, notably in oil of wintergreen from *Gaultheria procumbens* (27), etc. Methyl esters of the fatty acids occur in the fruits of various plants (28), and the methyl ester of anthranilic acid occurs in neroli oil from the flowers of the bitter orange and from the peel of the sweet orange (29). Methyl cinnamate occurs in the oil from the root, stems and leaves of various plants (30). The methyl ester of methyl-anthranilic acid occurs in mandarin oil and possibly in the oil of rue (31). The following acids have been found to be methyl esters: atraric acid, a product of the decomposition of

-
- (16) Lieben, Monatsh., 19, 333.
 (17) Schimmel's Ber., Oct., 1896.
 (18) *Idem*, Oct., 1898.
 (19) *Idem*, April, 1900. From the roots of *Andropogon muricatus*.
 (20) Zincke and Franchimont, Ber., 4, 822.
 (21) Von Romburg, Schimmel's Ber., April, 1897; April, 1898.
 (22) Gutzeit, Ann., 177, 382.
 (23) Von Romburg, Schimmel's Ber., Oct., 1894, April, 1896.
 (24) Schimmel's Ber., April, 1901.
 (25) Schnedermann, Ann., 41, 384.
 (26) Compt. rend., 131, 1323.
 (27) For a complete list of plants containing methyl salicylate, see Cahours, Ann., 48, 60; Schimmel's Ber., April, 1900.
 (28) Gutzeit, Ann., 177, 344; Tiemann and Kruger, Ber., 26, 2675.
 (29) Schimmel's Ber., April, 1900; April, 1898.
 (30) *Idem*, April, 1898.
 (31) Walbaum, J. prakt. Chem., (2), 62, 135; Charabot, Compt. rend., 135, 580; Schimmel's Ber., Oct., 1901.

antranorin (32), rangiformic acid (33), lecidic acid (34), parelic acid (35), thamnolic acid (36), vulpic acid (37), etc.

Methyl Alcohol Occurs as a Product of Fermentation.

Methyl alcohol is also among the products of the fermentation of glycerol by *Bacillus bovocapricus* (38), of the bacterial fermentation of calcium glycerate (39), and of the fermentation of the juice of the sugar cane by a special (wild) yeast (40).

These occurrences might acquire more than passing significance in chemically proving the origin of wood alcohol in a matter at law, especially in connection with a question as to the presence of methyl alcohol in flavoring extracts and medicines intended for internal use.

Properties of Methyl Alcohol.

Methyl alcohol ("Wood Alcohol," "Wood Spirit," "Wood Naphtha," Carbinol, Methanol, Methyl Hydroxide, Methyl or Methylic Hydrate, Methylic Alcohol), when in the pure state, is a colorless, mobile liquid, having a pure vinous odor (41), similar to that of ethyl alcohol, and possesses a burning taste. The boiling point, as given by different observers, varies from 55° to 66.5° C. (42), and the specific gravity from 0.8098 to 0.8612 at 0° C. (43), and 0.7973 to 0.810 at 15° C. (44). Methyl alcohol burns with a pale blue flame; it is miscible in all proportions with water, ethyl alcohol and ethyl ether. In its solvent properties (45) and chemical reactions it presents close analogies to ethyl alcohol (46).

(32) For occurrence see: Hesse, Ber., 30, 359; J. prakt. Chem., (2), 57, 287, 422.

(33) Paterno, Gazz. chim. Ital., 13, 259.

(34) Hesse, J. prakt. Chem., (2), 58, 508.

(35) Schunck, Ann., 54, 274.

(36) Zopf, Chem.-Centr., 1893, ii, 54.

(37) Bolley, Jahresber., 1884, 554.

(38) Emmerling, Ber., 29, 2727.

(39) Fittz, Ber., 13, 1312.

(40) Marcano, Compt. rend., 108, 955.

(41) The empyreumatic odor of common "wood spirits" is due to impurities.

(42) Regnault, 66.78° (Beilstein, I, 220); Perkin, 65.9° (J. Chem. Soc., 45, 465); Vincent, Delachnal, 64.8° (Bull. Soc. Chim., 33, 469); Grodzki, Kramer, 65.75°—66.25° (Beilstein, I, 220); R. Schiff, 64.8° (Ann., 220, 1100); Dittmar and Stewart give 55.1° for the perfectly anhydrous compound (Chem. News, 33, 35).

(43) Pierre [Ann. chim. phys., (3), 15, 25] obtained 0.82704 at 0°; Kopp (Pogg. Ann., 72, 53) gives 0.81796 at 0°; Kopp (Ann., 94, 257) gives 0.8142 at 0°; Vincent, Delachnal (Jahresber., 1880, 396) give 0.8098 at 0°; Zander (Ann., 224, 88) obtained the sp. gr. 0.8111 at 0°; Pagliani, Battelli (Beitr. Ann. Phys. Chem., 10, 222) give 0.8612 at 0°.

(44) At 15° the following numbers are given: Mendeleeff (Jahresber., 13, 7) gives 0.8065; Graham (Clarke's "Constants of Nature," p. 187) obtained 0.7973; Duclaux [Ann. chim. phys., (5), 13, 86] gives 0.7995; Grodzki and Kramer (Z. anal. Chem., 14, 103) give 0.7997; they also (Ber., 9, 1929) obtained 0.7984; Regnault and Villejean (Compt. rend., 29, 82) obtained 0.810.

(45) Methyl alcohol is a good solvent for fats, volatile oils, camphor, resins, gums, alkalies, and various salts.

(46) For differences in the chemical behavior of methyl and ethyl alcohols, see C. A. Lobry de Brun, Ber., 26, 268 (1893).

Different Names Under Which Purified Wood Alcohol Appears in Commerce.

Pure methyl alcohol (47) is sold in the United States under various names, viz.:— "Columbian Spirits," "Colonial Spirits," "Manhattan Spirits," "Hastings Spirits," "Alcolene," "Eagle Spirits," "Union Spirits," and "Lion d'or;" in Canada it appears under the names of "green wood spirits" and "standard wood spirits;" in Germany the newest variety is "pro spirit" (48).

Impure Wood Alcohol.

The names wood spirit, wood naphtha, and pyroxylic spirit are applied to the impure methyl alcohol of commerce. It is a complex liquid, containing variable proportions of methyl alcohol, acetone, methyl acetate and formate, dimethyl acetal, allyl alcohol, aldehyde, methylamine, oil, water, etc. (49). The "tailings" contain furfural, methyl-ethyl ketone, and allyl acetate, with small quantities of paroxanthine (50). The best commercial wood spirit contains about 95 per cent. of real methyl alcohol, the common varieties from 75 to 90 per cent., while some samples may contain only 35 to 40 per cent. (51).

Properties of Wood Spirit.

Wood Spirit is a greenish yellow fluid possessing a characteristic odor and a nauseous taste. It is a good solvent and its miscibility with water depends upon the amount of acetone present. The crude spirit is usually sold at a specific gravity of from 0.980 to 0.850 at 60° F. (52).

Denatured Alcohol.

Denatured alcohol is ethyl alcohol to which has been added some substance or substances which may or may not be of a poisonous character. The intention is to so treat the alcohol as to

(47) Pure methyl alcohol is of 100 per cent. strength as it leaves the works, but it soon absorbs water on exposure so as to reduce its strength to 98 or 97 per cent.

(48) A. Hellmigel (Apoth.-Ztg., 27, 567) reports that, due to the notorious Scharnack catastrophe (1911), whereby many persons were fatally poisoned from the use of methyl alcohol, as well as recent stringent regulations relative to the use of this substance, a Luxemburg firm is attempting to exploit under the name of "Pro Spirit" an alcoholic substitute recommended for external use, pharmaceutical preparations and cosmetics. It consists of "pure acetone-free aromatized methyl alcohol."

(49) Wladesco, Bull. Soc. Chim., (3), 3, 498 (1890); Regnault and Villejean, Compt. rend., 29, 82; Wiley, N. Y. Med. J., 30, 1003 (1904); Dittmar and Fawsitt, Trans. Roy. Soc. Edinb., 1337, 503; J. Soc. Chem. Ind., 22, 685 (1903); Klar, Chem. Ind., 20, 152, 176 (1897).

(50) Allen, "Commercial Organic Analysis," 1, 72 (1908).

(51) Fawsitt, J. Soc. Chem. Ind., 22, 635 (1903). See also Allen, "Commercial Organic Analysis," 1, 72 (1908).

(52) See Fawsitt, loc. cit.

prevent its being drunk, but to admit of the use of such alcohol for industrial purposes.

The principal substances used as denaturants are commercial wood alcohol, pyridine partially rectified, bone oil which contains large amounts of pyridine, benzine and benzol; and, for special purposes, ether, castor oil, spirits of turpentine, caustic soda, distilled grease from sheeps' wool, and so forth.

Federal Law as to Denaturing Alcohol.

The enactment of legislation by the United States Congress, June 7, 1906, (53) permits the use of a tax-free domestic alcohol in the arts and industries, and for fuel, light and power, provided said alcohol shall have been mixed in the presence and under the direction of an authorized government officer with *methyl alcohol or other denaturing material or materials or admixtures of the same* which will destroy its *character as a beverage and render it unfit for liquid medicinal purposes* (54).

(53) "Law for Denatured Alcohol in the U. S." (Public Act No. 201).

(54) For United States Regulations, see Methyl Alcohol as a Denaturant, Chapter III., p. 937.

CHAPTER II

MANUFACTURE OF WOOD ALCOHOL.

Methods of and Materials Used in Manufacture.

The destructive distillation of wood is almost the only method of obtaining methyl alcohol in the United States possessed of practical interest, although in Europe it has been proposed to manufacture it by the destructive distillation of peat (55) and it has been obtained as a by-product from vinasse (56). Methyl alcohol may also be prepared by a variety of synthetical reactions (57), and recently a process has been developed for obtaining it as a by-product in the manufacture of wood-pulp by a soluble sulphite process (58).

The production from peat, vinasse and wood-pulp is considerable, and more or less incidental; and the synthetical methods are at present too expensive to be practised on a commercial scale. The commercial demand for methyl alcohol is therefore

(55) For description of process, see W. A. G. von Heidenstam, English Patent 2292, Feb. 5, 1900.

(56) Vinasse is the residue remaining after the distillation of fermented beet-root molasses.

(57) The chief methods proposed are:—

A. From methane.

(1) By chlorination in reflected sunlight (Berthelot, *Compt. rend.*, 45, 916).

(2) Incomplete oxidation [Mauvigne, *Bull. soc. chim.*, (2), 19, 243].

(3) Oxidation with ozone at ordinary temperatures [Otto, *Ann. chim. phys.*, (7), 13, 77].

(4) By passing methane and air over finely divided copper (Glock, *Ger. Pat.* 109014 of 1898; Coquillon, *Z. Spiritusind.*, 23, 182).

(5) By oxidation with hydrogen peroxide, ferrous sulphate, monopersulphuric acid, combined or alone (Lance and Elworthy, *Eng. Pat.* 7297, March 26, 1906).

(6) By oxidation at 30-50° C., using tan bark as a contact substance (Hausmann & Co., *Ger. Pat.* 214155, Sept. 26, 1906).

B. By the dry distillation of calcium formate (Lieben and Rossi, *Gazz. chim. Ital.*, 1871, 164; Lieben and Paterno, *Ann.*, 187, 293; Friedel and Silva, *Bull. soc. chim.*, (2), 19, 481).

C. By the electrolysis of an organic salt.

(1) From potassium malonate (Peterson, *Z. physikal. Chem.*, 33, 714).

(2) From potassium acetate (Hoefer & Moest, *Z. Elektrochem.*, 10, 833).

(3) From sodium acetate, perchlorate, sulphate, and potassium carbonate and bicarbonate (Moest, *Chem.-Centr.*, 74, i, 370).

D. From formaldehyde.

(1) By the action of potassium hydroxide (Lieben, *Monatsh.*, 22, 302).

(2) By the action of light on a mixture of it with water (Inghilleri, *Z. physiol. Chem.*, 73, 144).

E. From glycerine and glycerates.

(1) By distillation of glycerine with soda [Fernbach, *Bull. soc. chim.*, (2), 34, 146].

(2) By the action of carbon dioxide on sodium glycerate at 180° C. (Loebisch and Loese, *Wien. Ans.* 1881, 252).

F. From prussic acid (Linnemann and Siersch, *Chem. Centr.*, 39, 390).

G. From acetone by saturation with hydriodic acid or hydrochloric acid (Friedel, *Compt. rend.*, 46, 1165).

H. By the action of a zinc salt [$Zn(C_2H_5)_2$] upon monochlor-ether (Henry, *Chem. Cent.*, 62, ii, 680).

(58) See Meyer, U. S. Pat. 407442, July 23, 1889; Stora Kopparbergs Bergslags Aktiebolag, French Pat. 402331, April 23, 1909; Bergstrom, *Papierfabrikant*, 8, 970.

essentially met by submitting wood to destructive distillation, the methyl alcohol, together with many other products, being obtained from the vapors evolved. The residue from the distillation is charcoal, which finds employment as a domestic fuel and in the smelting of various ores (59).

Stages in Manufacture and Refining.

The manufacture of methyl alcohol in the United States on a commercial scale may be conveniently considered under the following heads, a detailed account being unnecessary:—

A. The manufacture of the crude product.

- (1) The raw materials and their preparation.
- (2) The process of destructive distillation of the wood.
- (3) The separation and distillation of the crude product.

B. The refining of the crude product; purification and rectification, especially the separation of the acetone.

Raw Materials Used.

Hard wood, preferably birch, beech, maple, oak, elm, and alder, is best for the purpose, and recently processes have been developed for the destructive distillation of sawdust and wood-waste (60).

Preliminary Treatment.

The wood used is thoroughly seasoned for 1½ to 2½ years and cut in 50-inch lengths (61), or, in the case of sawdust and chips, it is converted by pressure into briquettes or blocks. If it is not thoroughly dry, it is placed in the kilns, where the remaining sap and moisture are removed.

Process of Distillation.

The destructive distillation is carried on in large iron retorts at a temperature of 400 to 500° F. (62). These retorts are

(59) Chiefly iron ores, for the production of Swedish pig-iron.

(60) See Bergman, U. S. Pat. 504264, Aug. 29, 1893; Fischer, *Z. angew. Chem.*, 1900, 192; Orejavaoer, Chem. Fabrik. Muller, French Patent 357432, Sept. 2, 1905; Walker, *J. Soc. Chem. Ind.*, 30, 934; Norton, U. S. Consular Rept., Nov., 1911; *Chem. Eng.*, 17, 1.

(61) In most distillation plants, the wood is divested of its bark.

(62) No decomposition occurs below 160° C. Between 160-275° C., the pyroligneous acid is formed; about 275° C., the yield of gaseous products becomes marked; between 360-450° C., liquid and solid hydrocarbons are formed; and above 450° C. little change occurs,

usually made of steel of varying dimensions, and are provided with a large, tightly-fitting door or doors, one of which is provided with an outlet pipe about 15 inches in diameter; or the gasified products may be taken out through several delivery tubes on the side of each oven. The retorts are set in pairs in brick-work, and batteries of from 6 to 16 pairs are common. The cord wood is fed through the door and carefully stacked so as to completely fill the retort, or steel cars are loaded with the wood and run into the retort. In the larger works the retorts are constructed of brick and are of 50 cords capacity. They are provided with heavy iron doors which may be sealed after closing. The doors are tightly closed, and the retorts are heated from below by burning wood, coal, or charcoal, supplemented by the tar, red oil, and gas which are by-products in the industry; or the ovens may be heated by burning natural gas.

The gasified products of the distillation are run through condensers, which are usually tall closed wooden tanks, each enclosing a number of vertical copper pipes (2 inches in diameter), through which cold water flows. The non-condensed gaseous products are returned and burned under the retorts.

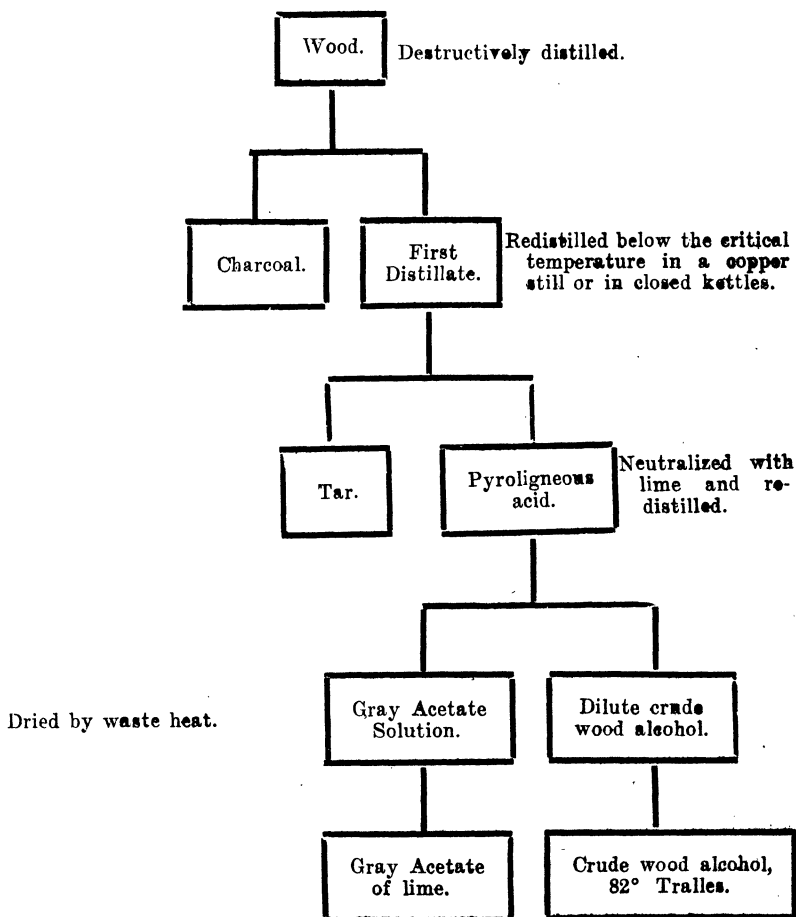
Treatment of Distillate.

The products condensed are run into tanks, and the tar is allowed to settle to the bottom; the pyroligneous acid, containing acetic acid, methyl alcohol, acetone, allyl alcohol, phenols, etc., remains on top. The pyroligneous acid is a dark red-brown liquid, having a strong acid reaction and a peculiar empyreumatic odor; its density varies from 1.02 to 1.05 (63). It is used to a limited extent in the manufacture of an impure acetate of iron, known as "black iron liquor" or "pyrolignite of iron," but is usually treated to separate the methyl alcohol (of which it contains 15 per cent.), acetone, and acetic acid. This is done by fractional distillation. The acetic acid is recovered by passing the vapors through milk of lime, whereby "gray acetate of lime" is obtained, or the pyroligneous acid is neutralized with lime before distilling off the alcohol, which latter process is technically called "making a tub." Usually three stills of about 2,500 gal-

lons each are employed, and from them are obtained distillates containing 15, 42 and 82 per cent. wood alcohol, respectively. It is a closed process, but not necessarily a continuous one. The commercial product thus obtained is of 82 per cent. strength by the Tralles alcoholometer, and contains varying amounts of acetone and other substances.

Graphic Presentment.

A graphic presentment of the process will, perhaps, make this clearer and is given below.



Purification and Rectification.

This crude material is usually shipped to a centrally located refinery in tank cars, iron drums, or in barrels for purification and rectification. This is accomplished by further distillation from lime or caustic alkalies. The acetone can not be removed by simple distillation and various methods for its separation have been proposed, *viz.*: conversion into chloracetones of high boiling points; conversion into chloroform and volatilizing by distilling the mixture with chloride of lime; crystallizing the methyl alcohol with calcium chloride and separating; forming the methyl ester, separating, decomposing by caustic potash and obtaining the alcohol by distillation (64). Various types of rectifiers are used, a technical discussion of which need not be entered into here. Suffice it to say that most of the processes are carried out in closed vessels. The final product thus obtained is commercial wood alcohol, which is usually sold at 95 per cent. strength by Tralles' Alcoholometer, and contains from 10 per cent. to 20 per cent. acetone and varying proportions of other organic impurities. Sometimes commercial wood alcohol is still more highly rectified and refined up to strengths of from 97 to 98 per cent. by volume of real methyl alcohol, and then sold under various names (65).

Extent of the Industry in the United States.

The manufacture of acetate of lime and methyl alcohol was started in the United States about 1867 by James A. Emmons and A. S. Saxon, in Crawford County, Pa., although the manufacture of pyroligneous acid was begun by Ward (66) in 1830. In 1874, George C. Edwards established the Burcey Chemical Works at Binghamton, N. Y., to refine the crude wood spirit produced by various manufacturers. In 1900, there were ninety-nine establishments in the United States producing some of the crude substances enumerated above, of these eighty-four were regular wood-distilling establishments and produced 4,191,379 gallons of crude alcohol, having a value of \$1,660,061; 81,702,000 pounds of acetate of lime, having a value of \$926,358; and 14,428,182 bushels of charcoal, having a value of \$612,009. These works employed \$4,858,824 of capital and 1,268 wage

(64) See Allen, "Commercial Organic Analysis," I, p. 70 (1908).

(65) For list of names, see page 926.

(66) At North Adams, Mass.

earners. There were nine establishments reporting the production of the crude material and the refining of the alcohol in the same factory; and these establishments produced 637,856 gallons of refined alcohol, having a value of \$370,513; 5,134,000 pounds of acetate of lime, having a value of \$54,928; and 2,726,120 bushels of charcoal, having a value of \$114,663. They employed \$760,156 of capital and 254 wage earners. During the years 1909-1910 there were 147 establishments engaged in wood distillation in the United States, employing 3,039 wage-earners and \$13,017,000 of capital. Of these, 117 were engaged in dry distillation of hardwoods, chiefly birch, beech and maple. The quantity of hardwood consumed during the year was 1,257,997 cords, or 86.7 per cent of the total of all woods consumed in distillation, and the total value of the product was \$9,737,000

Geographical Distribution of Works.

GEOGRAPHICAL DISTRIBUTION OF WORKS PRODUCING CRUDE PRODUCTS, 1900.

| STATE. | Number
of
establishments. | Average
number of
wage earners. | Value
of
products. | Per cent.
of
total. |
|--|---------------------------------|---------------------------------------|--------------------------|---------------------------|
| Pennsylvania..... | 58 | 878 | \$2,339,536 | 61.3 |
| New York..... | 24 | 354 | 786,252 | 20.3 |
| Michigan..... | 5 | 169 | 505,069 | 13.2 |
| North Carolina..... | 3 | 12 | 18,409 | 0.4 |
| New Jersey, Indiana, and
Massachusetts..... | 3 | 74 | 184,000 | 4.8 |
| United States..... | 93 | 1,487 | \$3,833,266 | 100.0 |

In 1905, the geographical distribution of wood distillation establishments, not including turpentine and rosin, was as follows:

| STATE. | Number
of
establishments. |
|---------------------|---------------------------------|
| Alabama..... | 1 |
| Connecticut..... | 1 |
| Florida..... | 4 |
| Georgia..... | 9 |
| Kentucky..... | 1 |
| Louisiana..... | 2 |
| Massachusetts..... | 2 |
| Michigan..... | 9 |
| Minnesota..... | 1 |
| Mississippi..... | 1 |
| New York..... | 32 |
| North Carolina..... | 7 |
| Pennsylvania..... | 63 |
| South Carolina..... | 5 |
| Vermont..... | 2 |
| Washington..... | 1 |

Production.

CRUDE MATERIALS PRODUCED, 1880 to 1910.

| YEAR. | Number of establishments. | WOOD ALCOHOL. | | ACETATE OF LIME. | | CHARCOAL. | |
|-----------|---------------------------|---------------|-----------|------------------|-----------|------------|----------|
| | | Gallons. | Value. | Pounds. | Value. | Bushels. | Value. |
| 1880..... | 17 | ..... | \$86,274 | 6,593,009 | \$156,892 | ..... | \$31,770 |
| 1890..... | 53 | 1,116,075 | 688,764 | 26,778,415 | 315,430 | ..... | ..... |
| 1900..... | 93 | 4,945,963 | 1,976,986 | 86,826,000 | 981,286 | 17,154,302 | 726,672 |
| 1910..... | 147 | 8,468,083 | 2,082,253 | ..... | ..... | ..... | ..... |

PRODUCTION OF REFINED ALCOHOL, 1890 AND 1900.

| YEAR. | Number of Establishments. | Gallons. | Value. |
|-----------|---------------------------|-----------|-------------|
| 1890..... | 4 | 166,342 | ..... |
| 1900..... | 18 | 3,038,140 | \$2,296,898 |

Exports.

EXPORTATION OF WOOD ALCOHOL, 1900 TO 1911.

| YEAR. | Gallons. | Value. |
|-----------|-----------|-----------|
| 1900..... | 540,799 | \$320,306 |
| 1904..... | 1,194,433 | 585,359 |
| 1905..... | 1,097,451 | 603,385 |
| 1906..... | 780,222 | 466,467 |
| 1907..... | 2,150,311 | 862,819 |
| 1908..... | 1,958,630 | 819,763 |
| 1909..... | 1,100,495 | 383,788 |
| 1910..... | 1,691,000 | 760,000 |
| 1911..... | 2,040,000 | 898,000 |

The larger part of the export of wood alcohol for the past six years went to Germany, the United Kingdom and Belgium.

Imports into the United States.

During 1910, wood alcohol valued at \$5,696 was imported into the United States.

Statistics Relating to the Industry in Europe.

Among the European nations, Austria-Hungary and Sweden are large producers of crude wood spirit, while Germany is the principal marketer of purified wood spirit.

The crude wood spirit imported into Germany in 1911 amounted to 8,759,300 kg., valued at 5,694,000 marks; 4,168,700 kg. came from Austria-Hungary, 268,700 kg. from Sweden, and 4,318,800 kg. from the United States. In 1910, 8,726,900 kg. of crude wood spirit were imported. In 1911, Germany exported 1,739,200 kg. of purified wood spirit, valued at 1,267,000 marks. France took 919,300 kg.; Italy, 138,700 kg.; Holland, 236,300 kg.; and Switzerland, 170,500 kg. In 1910, 1,782,400 kg. of purified wood spirit were exported by Germany. In 1910, France imported methyl alcohol valued at 1,819,006 francs, while the exportations for the same year were valued at 106,480 francs.

In 1911, 291,600 kg. of methyl alcohol, valued at 379,080 lira, were imported by Italy, while but 500 kg., valued at 650 lira, were exported.

CHAPTER III

THE USES OF METHYL ALCOHOL.

A. *For Denaturing Ethyl Alcohol.*

B. *In the Chemical Industries.* Methyl alcohol is used in the manufacture of coal tar colors and dyes (methylene blue, green, violet, etc.); perfumes ("Yara-yara," "Eau de Cologne," "Florida Water," etc.); transparent soap; smokeless powder and other explosives; varnish, finish, lacquers, stains, etc.; fulminate of mercury; inks; celluloid, xylonite, and similar products; oil cloth, leather clothes, pegamoid, and similar materials; photographic materials; formaldehyde; organic compounds (synthetic oil of wintergreen, etc.); "methylated ether," and as a reagent in chemical laboratories.

C. *In Pharmaceutical and Medicinal Preparations.* Methyl alcohol is employed in the preparation of synthetic drugs (methylal, methyl esters, etc.); in toilet preparations (bay rum, witch hazel, "Florida Water," etc.); in essences, extracts (extract of lemon, orange, etc.), tinctures (tincture of iodine, etc.), liniments, lotions and embrocations, patent medicines, proprietary and domestic medicines, solid medicinal preparations, surgical dressings, cattle medicines, plant washes, and in capsules and other medicinal appliances.

D. *In the Arts and Crafts.* Methyl alcohol finds application in the manufacture of hats (stiff, silk and straw), electrical apparatus, gas and electric fixtures, furniture, pianos and organs, cabinet work, picture moulding, burial caskets, passenger cars, wagons and other vehicles, boots and shoes, toys, whips, lead pencils, brushes, rattan goods, brass beds, various kinds of metal hardware, incandescent mantles, artificial flowers; in dyeing establishments; in cleaning in laundries, etc.; and in the painting industry.

E. *Unclassified.* Other uses of methyl alcohol are as a fuel and illuminant. It also is employed for a variety of domestic

purposes (cleaning, etc.); its *abuses* are conveniently considered in this connection.

Denatured Alcohol.

A. Methyl Alcohol is a Denaturant for Ethyl Alcohol.

In 1906, the United States, following the example set by England, France, Germany, and other European countries, enacted a law permitting the general use of a tax-free domestic alcohol for industrial purposes and for light, heat and power. In order to prevent alcohol intended for industrial purposes being used as a beverage or for liquid medicinal purposes (*i. e.*, patent or proprietary medicines), the law enacted requires that tax-free alcohol for use in the arts and manufactures shall have first admixed with it certain substances which destroy its suitability as a beverage.

Value of Methyl Alcohol as a Denaturant.

Methyl alcohol, on account of its poisonous properties, cheapness, difficulty of removing from the resulting industrial alcohol, non-interference with most of the industrial purposes for which the denatured alcohol is intended, and various other reasons (67), was chosen by the Commissioner of Internal Revenue as the principal denaturant. The regulations (68) provide that the agents used for denaturing alcohol shall consist of methyl alcohol and benzine or methyl alcohol and pyridine bases in the following proportions:—

U. S. Regulations.

To every 100 parts by volume of ethyl alcohol of the desired proof (not less than 180°), there shall be added ten parts by volume of the approved methyl alcohol (69) and one-half of one

(67) *A very important reason was the complaint of the manufacturers of methyl alcohol that the introduction of a tax-free alcohol meant the destruction of their business.

(68) Regulation No. 30, U. S. Internal Revenue, Sec. 26; amended Dec. 10, 1906 (Circular No. 686).

(69) *The methyl alcohol must be partially purified and must conform to the following analytical requirements: *Color*.—This shall not be darker than that produced by a freshly prepared solution of 2 cc. of N/10, iodine diluted to 1,000 cc. with distilled water. *Specific Gravity*.—It must have a specific gravity not more than 0.830 at 60° F., corresponding to 91° Tralles' scale. *Boiling Point*.—100 cc. slowly heated in a flask under conditions described (see Circular No. 680) must give a distillate of not less than 90 cc. at a temperature not exceeding 75° C. at 760 mm. pressure. *Miscibility with Water*.—It must give a clear or only slightly opalescent solution when mixed with twice its volume of water. *Acetone Content*.—It must contain not more than 25 or less than 15 grams per 100 cc. of acetone and other substances estimated as acetone when tested by Messinger's method. *Esters*.—It should contain not more than 5 grams of esters per 100 cc. of spirit, calculated as methyl acetate and determined as in Circular No. 680. *Bromine Absorption*.—It must contain a sufficient quantity of impurities derived from the wood, so that no more than 25 cc. or less than 15 cc. shall be required to decolorize a standard solution containing 0.5 gram of bromine (see Circular No. 680). In addition, the methyl alcohol must be of such a character as to render the ethyl alcohol with which it is mixed unfit for use as a beverage.

part by volume of approved benzine, or two parts of methyl alcohol and one-half of one part of pyridine bases (70).

Denatured alcohol is employed in large quantities in the arts and crafts, and in the chemical industries; and in recent years it has displaced wood alcohol to a large extent. It is used as a solvent for shellac in the manufacture of all kinds of wood products, such as passenger cars, carriages, furniture, pianos, organs, billiard tables, burial caskets, toys, whips, trunks, pipes, etc. Shellac is used as a binding material in the manufacture of lead pencils (71) and electric motors and generators (72). It enters intimately into the manufacture of stiff, silk, straw and felt hats, in which cases the shellac is incorporated in the body of the hat by the aid of alcohol. Similarly, it enters into the manufacture of lacquers, enamels, etc., used to enamel the surface of metals such as hardware, iron, brass beds, gas and electrical fixtures, lamps, brass musical instruments, bird cages, clocks, watches, toys, etc.

In the Chemical Industries.

The manufacture of celluloid, xylonite, collodion, artificial silk, etc., are dependent upon the availability of denatured alcohol. It is used in large quantities in the manufacture of smoke-

(70) For example, to every 100 gallons of ethyl alcohol there shall be added 10 gallons of methyl alcohol and one-half gallon of benzine, or 2 gallons of methyl alcohol and one-half gallon of pyridine bases. On the pyridine bases as a denaturant for alcohol, see Kraemer, *Z. Spiritusind.*, 38, 437 (1912).

SPECIAL DENATURING AGENTS.

Reg. No. 30, U. S. Internal Revenue provides:

Section 79. As the agents for use in complete denaturation render the alcohol denatured unfit for use in many industries, special denaturants are authorized by the Commissioner of Internal Revenue.

Section 80. The Commissioner of Internal Revenue will consider any formula for special denaturation that may be submitted by any manufacturer in any art or industry. But one special denaturant will be authorized for the same class of industries, unless it shall be shown that there is good reason for additional special denaturants.

SPECIAL DENATURANTS IN USE.

1. For varnish and similar substances: 20 l. of a shellac solution (1 part of shellac to 2 parts of alcohol, 90°) per 100 l. of spirit.
2. For the production of celluloid and pegamoid: 1 kilogram of camphor or 2 l. of turpentine or $\frac{1}{2}$ l. of benzol.
3. For the production of ether, ethyl chloride, bromide, and iodide, ethyl sulphuric salts, chloral hydrates, etc.: 10 l. of sulphuric ether, or 1 l. of benzol, or $\frac{1}{2}$ l. of turpentine, or 0.025 l. of animal oil, or sulphuric acid, hydrochloric acid and nitric acid.
4. Chloroform: 5-6 kilos. of chloride of lime, or 300 g. of chloroform.
5. Vinegar: Acetic acid in varying proportions and water.
6. Inks, waxes, etc.: 0.5 l. of turpentine, or 0.025 l. of animal oil.
7. Iodoform: 200 g. of iodoform.
8. Soap-making: 1 kilo. of castor oil and 400 cc. of soda solution.
9. For preparing dye substances: Sulphuric ether (10 l.), or coal tar oil (1 l.), or turpentine ($\frac{1}{2}$ l.), in varying proportions, or aniline dyes (25 grams), or camphor ($\frac{1}{2}$ kilo.), and various other special denaturants.

(71) The shellac, dissolved in alcohol, binds together the moulded graphite.

(72) The coils of insulated wire are held in place by this binding shellac.

less powder, fulminate of mercury and other explosives. An important use of industrial alcohol is in the manufacture of ethyl ether, chloroform (73), and ethyl chloride. Another utility of the alcohol is in the production of dyes, where it enters as a solvent, a medium of interaction, or as a chemically active body. There is also the manufacture of fine chemicals, a very important industry, in which alcohol enters.

As an Illuminant and Fuel.

The use of denatured alcohol as an illuminant, fuel and in gas engines is of growing importance. Hundreds of patents have been taken out for all sorts of alcohol lamps, and hundreds of alcohol heating-mechanisms have been put on the market, especially in Europe.

Production.

The withdrawals of alcohol in the United States in the fiscal year 1910-11, for the purpose of denaturing, upon which no taxes were paid, amounted to 11,062,060 proof gallons, and there remained at the end of the year, in bonded warehouses, 2,213,390 proof gallons. In 1910-11, Germany produced 91,765,078 gallons of alcohol, of which 37,141,633 gallons were consumed in the industrial arts; and, in 1910, 3,962,412 gallons of denatured alcohol were made in England. 3,008,514 gallons of industrial methylated spirit were used in manufacturing operations and for other purposes in the United Kingdom in the year ended March 31, 1912. The Swiss importations of denatured spirit amounted to 6,993,900 kg. in 1911; of this quantity, 6,246,500 kg. came from Austria-Hungary, a large producer of methyl alcohol.

B. Uses of Wood Alcohol in the Chemical Industries.

The chief uses of wood alcohol in the chemical industries are as follows:—

1. As a solvent.
2. As an extraction agent.

(73) Chloroform is no longer prepared from denatured alcohol or ethyl alcohol in this country.

3. As a raw material for the production of formaldehyde.
4. In synthetic chemistry for the introduction of the methyl (CH_3) group.
5. As a reagent in chemical laboratories.

Wood Alcohol as a Solvent.

Wood alcohol is a good solvent for fats, volatile oils, camphor, resins, gums, alkalies, and various salts. Because of its cheapness, it is used as a solvent for varnishes, lacquers, stains, finish and shellac. It is also used as a solvent in the manufacture of certain inks, photographic materials, celluloid, xylonite, and similar products, and incidentally in the manufacture of transparent soap. In celluloid, xylonite, etc., the alcohol does not appear in the finished product, while in varnish, shellac, etc., the wood alcohol remains as such and may produce its deleterious effects on workmen employing these in the industries.

As an Extractive.

As an extractive, wood alcohol is used in the manufacture of smokeless powder, fulminate of mercury, nitrocellulose, and other explosives. Thus, dried, pulped military guncotton is freed from lower cellulose nitrates by extraction with wood alcohol (74).

For the Production of Formaldehyde.

Formaldehyde, which has an extensive use, is produced from methyl alcohol by oxidizing with air by the aid of a catalytic agent. It is prepared on a large scale by passing a mixture of methyl alcohol vapor and air over a glowing platinum spiral or heated copper gauze (75). Formaldehyde may also be prepared by the electrolysis of dilute methyl alcohol and when ozone is passed through it.

Commercial formaldehyde is a 40 per cent. water solution, containing from 12-15 per cent. of methyl alcohol.

In Synthetic Chemistry.

Methyl alcohol is used in synthetic chemistry for the introduction of the methyl group (CH_3) into various substances.

(74) Monroe, United States Patent 489684 of 1893; English Patent 580 of 1893.

(75) See LeBlanc and Planchke, Z. Elektrochem., 17, 45 (1911); Glassner, Oesterr. Chem.-Ztg., 5, 337.

In the manufacture of artificial perfumes and flavors, it was discovered that the presence or addition of the methyl group converted certain odorless and tasteless bodies into those possessing strong perfumes or flavors. Thus, methyl benzoate ($C_6H_5COOCH_3$) is prepared by distilling wood spirit with benzoic and sulphuric acids; it is used in perfumery under the names "Essence Niobé" and "Peau d'Espagne." Methyl betanaphtholate ($CH_3O.C_{10}H_7$), known in commerce under the names "Nerolin" and "Yara-yara," is prepared by boiling betanaphthol with methyl alcohol and zinc chloride; it is one of the strongest smelling perfume materials. Methyl cinnamate ($C_6H_5.CH:CH.COOCH_3$) is prepared by distilling methyl alcohol with sodium cinnamate and sulphuric acid; it is used as a flavoring extract in confectionery and as a perfume. Methyl anthranilate, a very fragrant perfume, is prepared by condensing anthranilic acid with methyl alcohol. Methyl alcohol is also used in the preparation of vanillin, etc. It is used in a similar manner in the manufacture of various aniline dyes, viz., methylene blue, green and violet.

As a Chemical Reagent.

Methyl alcohol is used as a reagent in chemical laboratories for the detection of salicylic acid, the determination of boric acid, in the preparation of grape sugar, and as a substitute for ethyl alcohol for various purposes.

C. Uses of Methyl Alcohol in Pharmacy and Medicine.

Methyl alcohol is used in pharmacy and medicine chiefly as a solvent, a substitute for ethyl alcohol, and as a chemically active body.

As an Extractive.

As an extraction menstruum for the preparation of solid extracts, methyl alcohol gives a better yield than ethyl alcohol for many substances. Thus for belladonna, nux vomica, jalap resin, etc., the former is a much better solvent than the latter (76). Again, another advantage claimed for methyl alcohol for this purpose is its greater volatility. However, the toxic

(76) See Batta, Bull. Soc. Chim. Belg., 36, 7 (1912); Rosenthaler, Pharm.-Ztg., 55, 261.

action of methyl alcohol should preclude its use in any preparation intended for internal use (77).

Substitute for Ethyl Alcohol.

Methyl alcohol is employed in large quantities as a cheap substitute for ethyl alcohol in washes, tinctures, liniments, patent medicines, proprietary and domestic medicines, extracts, essences, cattle medicines and plant washes. A large number of poisoning cases are reported every year from drinking Jamaica ginger, extract of lemon, bay rum, "eau de Cologne," etc. (78).

In Synthetic Drugs.

As a chemically active body, methyl alcohol is used in the manufacture of synthetic drugs. Thus methyl salicylate, artificial (synthetic) oil of wintergreen, used as an antirheumatic and antiseptic, is prepared by distilling methyl alcohol with salicylic and sulphuric acids. The anesthetic methyl chloride (79) is prepared by distilling methyl alcohol with common salt and sulphuric acid. Gallicin (methyl gallate), an antiscatarrhal, is prepared by heating a solution of gallic or tannic acid with concentrated sulphuric acid and methyl alcohol. The sedative and hypnotic methylal (80) is prepared by distilling methyl alcohol with dilute sulphuric acid and manganese dioxide. Methylene blue (81), methylene chloride (82) and other drugs are prepared in a similar manner.

D. Uses of Wood Alcohol in the Arts and Crafts. As a Solvent.

The pure grades of methyl alcohol, sold under the names of "Columbian spirits," "Colonial spirits," etc., find their chief employment in the arts and crafts as solvents for shellac. Thus, shellac "cut" in wood alcohol is used in the manufacture of passenger cars, carriages, furniture, pianos, organs, cabinet

(77) Kobert (Pharm.-Ztg., 51, 518), warns against the use of methyl alcohol in pharmaceutical and medical preparations.

(78) For cases see *Appendix C.*, p. 1004.

(79) This has been used as a local anesthetic for severe neuralgia, pruritus and spinal pains.

(80) Used internally in delirium tremens, gastric and intestinal pains, insomnia, and in strychnine poisoning. Commercial methylal is used in perfumery for extracting odors.

(81) Used in malaria, rheumatism, cystitis, pyelitis, carcinoma, blackwater fever, diabetes, gonorrhea, and neuralgia.

(82) Prepared by treating a mixture of methyl alcohol and chloroform with zinc and hydrochloric acid, and used as a spray to produce local anesthesia in dentistry.

work, picture moulding, hats, electrical apparatus, toys, whips, brushes, lead pencils, rattan goods, etc. It is used as a solvent for lacquers and enamels, for polishing the surface of metals such as brass beds, hardware, gas and electric light fixtures, clocks, watches, etc., and also in the manufacture of boots and shoes. Another important use of wood alcohol is as a cleaning fluid in laundries. Again, it is used by painters for removing old paint, and in shellac, varnish, stains and lacquers.

E. *Unclassified.*

Wood alcohol is used extensively as a liquid fuel, and for such domestic purposes as a cleaning agent. *It is easily purchased and is a common household article.*

ABUSES OF METHYL ALCOHOL.

Methyl Alcohol as an Adulterant.

The data obtainable from the literature indicate that the drinking of liquors containing methyl alcohol is responsible for most of the deaths and blindness attributable to methyl alcohol. The "deodorized" methyl alcohol resembles ethyl alcohol so closely that the ordinary layman can hardly distinguish the difference between the two (83), and, as it costs less than one-fourth as much as grain alcohol, people are tempted to use it as a substitute for ethyl alcohol in adulterating whiskey, essences, extracts, bitters, washes, liniments, balsams, perfumes, etc.

Class of Consumers.

The victims are generally those who indulge in the commoner forms of whiskey, rum and wine: soldiers and sailors who frequent low resorts, men who go on protracted spree, the low negro population of the country, Indians who are unable to obtain the better grades of whiskey, etc.

Persons not addicted to the use of intoxicating drinks are undoubtedly often affected innocently, from drinking Jamaica ginger, lemon extract, essences of lemon, cinnamon, peppermint, etc., bitters, patent medicines, proprietary medicines, balsams, etc., whose chief menstruum is "deodorized" wood alcohol. Methyl

(83) See *Properties of Methyl Alcohol*, p. 925.

alcohol is also used as a substitute for ethyl alcohol to adulterate witch hazel, bay rum, "eau de Cologne," Florida water, and in liniments. A considerable quantity of "deodorized" methyl alcohol, under the names of "Columbian spirits," "Colonial spirits," etc., is absorbed annually by individuals ignorant of its toxic action, by the poorer negroes, who drink it under the name of "white horse" or "old mule," and by individuals with the craving for alcohol who are unable to obtain ethyl alcohol.

Present Condition of the Adulteration.

The adulteration of alcoholic beverages and extracts with methyl alcohol is still going on. Now and then the daily papers report a few cases of poisoning from drinking whiskey containing methyl alcohol. Sometimes, when an epidemic of such poisoning occurs, it is prominently brought before the public, as when 25 persons were fatally poisoned in New York City in 1905, or when, at the recent Sharnack catastrophe in Berlin, hundreds of persons were fatally poisoned. That the adulteration of whiskey is widely practised was proven by Warren, Pure Food Commissioner of Pennsylvania, who collected 1,000 samples of cheap whiskey from all parts of the State and found 95 per cent. of them to contain varying quantities of methyl alcohol, some as high as 75 per cent. Brooks, State Chemist of New Jersey, reported, in 1903, that from 4-8 samples of paregoric and from 4-11 samples of ginger contained wood alcohol. Scovill (84) found 2 out of 6 commercial liniments to contain wood alcohol. Greenwood (85) found "Columbian spirits" in tinctures obtained in Boston drug stores. Patch (86) found methyl alcohol in 40 out of 225 samples of spirits of camphor. The New York City Board of Health, in 1902, found that 40 out of 215 drug stores were substituting wood alcohol for ethyl alcohol in Jamaica ginger and spirits of ammonia. In 1907, the same department found 12 samples of toilet waters, 5 hair tonics and 2 samples of cologne to contain methyl alcohol; in 1910, wood alcohol was found in 8 samples of whiskey; in 1911, in 7 samples of whiskey; in 1912, in 16 samples of whiskey,

(84) Mass. Pharm. Assn., 1897.

(85) Cited by Buller and Wood, J. Am. Med. Assn., 1904, 972.

E. (86) Am. Pharm. Assn., 1902.

in 316 samples of vino vermouth, in 9 flavoring extracts, in one bay rum, and in Marsala wines, bitters and various cordials (87). The State Board of Health of Massachusetts has also had some experience with methyl alcohol as an adulterant: In 1903, one sample of tincture of iodine was found to contain methyl alcohol; in 1904, two samples of tincture of iodine examined contained methyl alcohol; in 1905, samples of lemon extract put out by one manufacturer had methyl alcohol therein; in 1911, samples of vanilla, lemon and orange extracts made by one manufacturer were found to contain denatured alcohol containing methyl alcohol; and in 1912, one sample of tincture of iodine examined contained methyl alcohol, while another sample was made with denatured alcohol containing methyl alcohol, acetone, and petroleum (88). The Board of Health of Detroit, Michigan, reports that: "Some eight years ago (*i. e.*, about 1904), we condemned and dumped into the sewer a quantity of lemon flavoring extract made up with wood alcohol, and since then we have not met with it but in one case, where it was used in a whiskey substitute made by the consumers themselves" (89).

(87) I am indebted to the New York Board of Health for this data.

(88) Private communications, dated November 7 and 20, 1912, from the Secretary of the State Board of Health, Boston, Mass.

(89) Private communication, dated November 3, 1912, from the Director of the Laboratory of the Board of Health, Detroit, Mich.

CHAPTER IV

IS METHYL ALCOHOL A POISON?

Widely varying ideas have prevailed at different periods as to the poisonous nature of methyl alcohol. Most of the early investigators considered it even less poisonous than ethyl alcohol, basing this view on the general law, that the toxicity of the alcohols increased with the carbon content and with the boiling point.

According to One Theory, Methyl Alcohol Should Be Less Poisonous than Ethyl Alcohol.

This property of the alcohols was first observed by Richardson (90), in 1864, and was later confirmed by Rabuteau and Cross (91). In 1880, Dujardin (92) modified this law by stating that the toxicity of the monatomic alcohols depended not only upon the number of carbon atoms, but also upon their origin, solubility and oxidation in the body. Again, Wirgin (93) proved that the disinfecting power of the alcohols increased with the molecular weight. Similarly, Baer (94) proved that the strength of the alcohols from $C-C_5$ increased with the number of carbon atoms. In 1908, Iwanoff (95) asserted that the poisonous action of the primary monatomic alcohols of the fatty series increased with the length of the chain. Fuhner (96) stated that the action of equimolecular solutions increased with the number of carbon atoms. Moreover, Francis and Fortescue-Brickdale (97) state that the intensity of the action of the alcohols depends upon the number of carbon atoms present and increases as the homologous series is ascended, although to some extent methyl alcohol is an exception (98).

(90) Trans. Brit. Assn., 1864, 1865, 1866.

(91) Compt. rend., 51, 631.

(92) Polyt. J., 234, 406 (1880).

(93) Z. Hyg., 49, 149.

(94) Cited by Harnack, Deutsch. Med. Wochschr., 33, 538.

(95) Dissertation St. Petersburg, 1907; Bio-Phys. Zentr., 3, 250.

(96) Arch. exp. Pathol. Pharmacol., 51, 1.

(97) "The Chemical Basis of Pharmacology," p. 92 (1908).

(98) Thus in the case of rabbits: Methyl alcohol, 8-12 g., without action. Ethyl alcohol, 7 g., drunkenness; 12 g., sleep. *n*-Propyl alcohol, 12 g., produce sleep in 5 minutes and death in 5 hours. *n*-Butyl alcohol, 3 g. produce drunkenness; 7 g., sleep and death. iso-Amyl alcohol, 2 g. produce drowsiness.

According to Francis and Fortescue-Brickdale (99), the ethyl group is stronger than the methyl group. Thus, certain hypnotic properties possessed by the ethyl group are entirely wanting in the corresponding methyl derivatives (100). Harnack (101) states that ethylmorphin is stronger than the corresponding methyl derivative, viz., 3:1.

Toxic Action on Plants and Animal Organisms.

That methyl alcohol is less poisonous than ethyl alcohol on lower plants and infusoria was proved by the experimental work of Wirgin (102) and that of Buchner, Fuchs and Neagle (103). Fuhner (104) stated that ethyl alcohol was three times more poisonous than methyl alcohol on sea urchins' eggs. Schlossberger (105) performed the first experiments on the toxicity of methyl alcohol on the (higher) animal organisms and concluded that its action was similar to that of ethyl alcohol, producing intoxication with small quantities and coma with larger amounts.

In 1869, Richardson (106) proposed the use of methyl alcohol as a general inhalation anesthetic, maintaining that it was less toxic than ethyl alcohol and slower in its action than chloroform.

Comparative Toxicity of Methyl and Ethyl Alcohols.

Quantitative experiments were performed by Joffroy and Servaux (107), who determined the toxic equivalent of methyl alcohol for the dog at 9 cc. (7.2 g.) per kg. body weight; of ethyl alcohol at 8.65 cc. (6.92 g.) per kg. For the rabbit, 10 cc. methyl alcohol and 8.15 cc. ethyl alcohol per kg. body weight were found. These authors stated that the action of methyl alcohol differed

(99) "The Chemical Basis of Pharmacology," p. 49 (1908).

(100) The ethyl-sulphone group possesses marked hypnotic properties, while the methyl derivatives are quite inert; also dulcin has an extremely sweet taste, whereas the corresponding methyl derivative is entirely wanting in this property.

(101) Deutsch. med. Wochschr., 33, 538 (1912).

(102) Z. Hyg., 40, 149.

(103) Arch. Hyg. Munch., 40, 347 (1901).

(104) Arch. exp. Pathol. Pharmacol., 61, 1.

(105) Ann., 73, 213 (1850).

(106) Med. Times and Gaz., 1869, 703; Lond. Med. Rec., 1876, 62, 77, 93. In the Sci. Am. Suppl., 19, 8240, Richardson summarized his work on anesthetics. He stated that from 1½ to 2 ounces of methyl alcohol by volume were required for complete anesthesia. The action was very slow, and with distinct symptoms of alcoholic intoxication. A full hour was required to produce insensibility, which at the deepest was insufficient to destroy reflex irritability. The breathing was stertorous, often with bronchial rale. Recovery was very slow, four to six hours in deep anesthesia. The temperature was reduced 3 degrees F. The danger was practically nil, but, when the inhalation was enforced, death was produced by the simultaneous cessation of the circulation and respiration.

(107) Arch. med. exp., 8, 490; 9, 707.

from ethyl alcohol in that the symptoms (108) were produced more slowly and the intoxication was more prolonged. Georg Baer (109) placed the toxic dose of methyl alcohol for the dog at 9.02 g. per kg. body weight and ethyl alcohol at 7.44 g. per kg., or, the toxicity of methyl alcohol is to that of ethyl alcohol as 0.8:1. Lessier (110) determined the toxic equivalent for the dog, finding methyl alcohol to be 15 g. per kg. body weight and ethyl alcohol 10 g. per kg. For fish, he found 50 g. for methyl and 40 g. for ethyl alcohol per kg. body weight.

The majority of the text-books on toxicology of the nineteenth century considered methyl alcohol no more poisonous than ethyl alcohol.

Kobert (111) stated, in 1893, that methyl alcohol was as poisonous as ethyl alcohol, but no more. This he withdrew in 1906 (112). In 1897, Jaksch (113) stated that methyl alcohol was not poisonous, and that people in England and Ireland used it as a beverage. Kunkel (114) stated that methyl alcohol had a similar effect upon the body to ethyl alcohol. He asserted that a larger dose of it was necessary to produce paralysis, and, as it acted slower upon the body, death might be produced through the paralysis of the respiratory center by increased somnolence for 3-4 days. Vogle and Boranzig (115) report that the action of methyl alcohol is similar to that of ethyl alcohol so far as poisoning is concerned.

Methyl Alcohol is a Distinct Poison.

On the other hand, the majority of the present authorities maintain that methyl alcohol is a severe poison. They explain the difference in the toxicity of methyl and ethyl alcohols by the property of the former to oxidize slowly in the animal body to formaldehyde and formic acid, while the latter oxidizes rapidly into carbon dioxide and water.

(108) The general symptoms are: Increase of body temperature, partial loss of power of temperature regulation, marked changes in the alimentary tract, convulsion, loss of sensation and reflex movements, convulsive movement of eyes, nystagmus with dilation of the pupils, and blindness.

(109) Arch. Anat. Physiol., 304, 283, 289 (1898).

(110) Munch. med. Wochschr., 69, 248.

(111) See Felelar, Press. Med. Chir., 47, 215, 223, 231 (1911).

(112) "Lehrbuch der Intoxikationen," p. 660.

(113) "Klinische Diagnostik," cited by Felelar, Press. Med. Chir., 47, 215, 223, 231.

(114) "Handbook of Toxicology," 1899.

(115) "Lehrbuch der Arzneimitteln," 1900.

Methyl Alcohol Is More Toxic than Ethyl Alcohol.

Even as early as 1875, Taylor (116) observed that methyl alcohol operated as a "narcotic poison," and later (1879) Poincaré (117) proved that methyl alcohol fumes produced marked anatomical and functional disturbances (118) in animals. Also, Dujordin and Beumetz-Audige (119) declared methyl alcohol to be more poisonous than ethyl alcohol; Blumenthal (120) proved methyl alcohol to be more poisonous on the muscle fibre than ethyl alcohol; and Holden (121) stated that methyl alcohol was more poisonous than ethyl alcohol (in his experiments 50 cc. caused death in the case of a 9 kg. dog). Riche (122) determined the toxic equivalent for methyl alcohol to be 0.66 g. per kg. body weight; ethyl alcohol, 2.65 g. per kg. Baudran (123) gave the toxic equivalent as follows: methyl alcohol, 1.44 g. per kg. body weight; ethyl alcohol, 2.65 g. per kg. Atchinson (124) gave the fatal dose for various animals: dog, 6.37-7.2 g. per kg.; rabbit, 7.2 g. per kg. body weight. From a series of experiments, Lewin (125) proved that methyl alcohol was more toxic than ethyl alcohol (126).

Physiological Action of Methyl Alcohol is Specific.

Julius Pohl (127) was the first to recognize the characteristic action of methyl alcohol as a poison. He stated that while he was able to give animals ethyl, iso-butyl, and amyl alcohols, in doses sufficient to cause intoxication for almost a year, without causing marked anatomical or functional disturbances, methyl alcohol, given in small doses every day, was tolerated for but a few weeks; the animals remained comatose for days, did not eat, and died, although the administration of the alcohol was discontinued. Pohl ascribed this difference to the fact that methyl alcohol was oxidized to formic acid in the body, in which form it was sepa-

(116) "Poisons," 659 (1875).

(117) Compt. rend., 87, 782 (1879).

(118) Great increase in size of abdomen, hypertrophy and fatty degeneration of the liver, and an alteration of the constitution of the muscular fibres of the heart, of the epithelial cells, of the uriniferous tubes, and of a large number of the cells of the lungs.

(119) Compt. rend., 80, 1876.

(120) Pflüger's Arch., 62, 513 (1896).

(121) Arch. Augenhk., 40, 351; Arch. Ophth., 38, 129.

(122) Munch. med. Wochschr., 69, 248.

(123) N. Y. Med. J., 8, 127 (1905).

(124) N. Y. State J. Med., 8, 127 (1905).

(125) Berl. Med. Klin., 8, 95 (1912).

(126) On injecting the alcohols in hens' eggs, half as many normals and twice as many monsters were formed by methyl as by ethyl alcohol.

(127) Arch. exp. Path. Pharmacol., 31, 281.

rated in the urine (128). This view was confirmed by Bongers (129), who asserted that after the administration of methyl alcohol to higher animals (dog), considerable quantities of formic acid and methyl alcohol were excreted in the urine. Schotten (130), and Greenhaut and Quinquad (131) state that the volatile fatty acids poor in carbon pass unchanged into the urine in large amounts and that this is especially true for formic acid.

Explanation of Difference in Action Under Different Conditions

Harnack (132) asserted that methyl alcohol on slow oxidation formed formic acid (133), and that on rapid oxidation carbon dioxide and water were formed. Hence, according to him, when methyl alcohol is oxidized rapidly in the body, it is harmless; this explains the varying toxic action of methyl alcohol upon different species of animals and even upon individuals of the same species (134). Harnack maintained that the action of the formic acid thus formed in the animal organism was stronger than that of pure formic acid introduced into the body, as in the latter case the organism attempts to connect it with bases and thus give rise to formates.

Birch-Hirschfeld (135) experienced great difficulty in keeping animals alive for even short periods when small doses of methyl alcohol were administered at close intervals. He concluded that methyl alcohol was a nerve poison, causing pathologic changes in the ganglia cells of the retina and cornea (136), and a degenerative change in the optic nerve (137).

Acute and Chronic Poisoning by Methyl Alcohol.

Reid Hunt (138) states that the action of methyl alcohol differs from that of ethyl alcohol in that the symptoms are produced more slowly and the intoxication is more prolonged. There are

-
- (128) The separation of formic acid reaches its maximum 3-4 days after the poisoning.
 (129) Arch. exp. Path. Pharmacol., 35, 426 (1895).
 (130) Z. physiol. Chem., 7; cited by Hammarsten, "Physiological Chemistry," p. 629 (1908).
 (131) Compt. rend., 104; Hammarsten, loc. cit.
 (132) Deutsch. med. Wochschr., 38, 358.
 (133) Formic acid is both an acid and aldehyde, viz., $\text{O}=\text{C}-\text{OH}$, acid; $\text{H}-\text{C}=\text{O}$, aldehyde. As an acid, it is more poisonous than the homologues of its series; on account of its aldehyde properties, it acts as a powerful reducing agent.
 (134) Methyl alcohol is an example of idiosyncrasy; some individuals are immune to it so far as permanent damage to the organism is concerned.
 (135) Centr. Ophth., 1907, 263; Arch. Ophth., 54, 68; Centr. Augenhk., 1902, 280.
 (136) As shown by the disappearance of chromatin vacuols in the protoplasm and the contraction of the cells.
 (137) Causing amblyopia and blindness, the symptoms of which are not similar to any other amblyopia symptoms.
 (138) Johns Hopkins Hosp. Bull., 13, 213 (1902); Hyg. Lab. U. S., Bull. 33.

two forms of methyl alcohol poisoning, acute and chronic. In acute poisoning, the relative toxicity of methyl and ethyl alcohols is almost equal (139); but when the use of methyl alcohol is continued for even a short time, it becomes an extremely dangerous poison. The difference in the toxicity of methyl and ethyl alcohols is due to the property of methyl alcohol to oxidize in the body, producing formic acid, while ethyl alcohol oxidizes rapidly into carbon dioxide and water.

Hollander (140) asserted that methyl alcohol was first oxidized in the body to formaldehyde (141) and then to formic acid.

That the toxicity of methyl alcohol is due to the formic acid into which it is oxidized has been denied by Ball (142), as the symptoms are different; and Kobert (143) stated that no cases of death solely by formic acid had been reported up to 1897.

Influence of Impurities on Toxicity.

Certain investigators maintain that the toxicity of methyl alcohol is due to impurities (144) present. Cololian (145) states that the poisonous properties of methyl alcohol are due to the acetone (146) present; Ohlemann (147) maintains that the toxicity of methyl alcohol is due to the furfural; and a prominent manufacturer, in a private communication to the author, asserts that the toxicity of methyl alcohol is due to allyl alcohol. Likewise, Julius Friedenwald (148), from extended experiments on the comparative toxicity of the various alcoholic beverages, concluded that their poisonous properties were not proportional to the percentage of alcoholic content, but rather to other substances which they contained (149); and recently Vandevelde (150) claimed to have proved experimentally that methyl

(139) The experiments performed by Hunt indicate that death is caused more rapidly by one or two large doses of ethyl alcohol than by corresponding doses of pure methyl alcohol.

(140) Munch. med. Wochschr., 67, 82 (1910).

(141) Formaldehyde is 33 times as toxic as methyl alcohol; 0.24 g. formaldehyde per kg. body weight is fatal to rabbits.

(142) Homeop. Eye, Ear and Throat J., N. Y., 2, 325 (1905).

(143) "Practical Toxicology," p. 83 (1897).

(144) The impurities present in commercial methyl alcohol are chiefly acetone, methyl acetate, dimethyl acetate, furfural, allylic alcohol, homologues and condensation products of acetone, together with oily bodies and other compounds.

(145) J. Physiol. Pathol. gen., 3, 535 (1901).

(146) Acetone, when taken internally, causes paralysis, according to Kobert ("Intoxikationen," p. 586) and Jaksch (Klinische Diagnostik, 1896).

(147) Wochschr. Therap. Hyg. Auges., 1902, Nos. 8, 9, 13.

(148) Trans. Assn. Am. Phys., 26, 61 (1911).

(149) Thus of the various drinks, liquors and rum are the most toxic, wine is more toxic than whiskey, beer and ale are about as toxic as whiskey.

(150) Bull. Soc. Chim. Belg., 28, 104 (1912).

alcohol, free from all impurities, was less toxic than ethyl alcohol. He asserted that the toxicity of the commercial alcohol was largely due to the presence of impurities (151).

Toxic Action Due to Methyl Alcohol Itself.

On the other hand, Pohl (152) contradicted the supposition that the toxic action of methyl alcohol was due to the acetone present, as the urine of dogs fed on large quantities of it contained but insignificant amounts of formic acid. Hunt was able to produce the same symptoms in animals whether he used pure or impure methyl alcohol, and concluded that its toxic action was due to the alcohol *per se*. Wood (153) stated that methyl alcohol exhibited its toxic properties whenever it was introduced into the human system *in whatever form* (154). Foerster (155) argues that the toxicity of methyl alcohol can not be due to furfural, as the amount of this substance in the alcohol is minute — in fact, less than 0.21 g. per liter (156).

Conclusions.

From the preceding we may draw the following conclusions: *Methyl alcohol is less poisonous to lower plants and infusoria* (157) *than ethyl alcohol, but for higher animals* (158), *and especially for man* (159), *it is a severe toxic agent*. Its poisonous properties are doubtless due, first, to a specific action, and then to its oxidation in the body, first to formaldehyde and then to formic acid (160). It is, furthermore, a cumulative poison (161). It produces toxic effects whether it be taken internally or inhaled through the lungs.

[¶](151) By the plasmolytic method, the iso-toxic quantities are 36.00-37.00 for methyl alcohol and 24.44-25.38 for ethyl alcohol; by hemolysis, the iso-toxic quantities are 100 for ethyl alcohol and greater for methyl alcohol.

(152) Arch. exp. Path. Pharmacol., 51, 281.

[¶](153) Expert Evidence at a Hearing before the Ways and Means Committee on Free Alcohol, Feb.-March, 1906.

[¶](154) Wood and Buller (J. Am. Med. Assn., Oct. 1-29, 1904; Internat. Clinic, 1906, 165; N. Y. Med. J., Jan. 7, 1905; Brit. Med. J., 1906, ii, 1855), report 314 serious cases of methyl alcohol poisoning caused by drinking and inhaling "Columbian spirits," Jamaica ginger, bay rum, "Eau de Cologne," liniments, etc.

(155) Münch. med. Wochschr., 89, 248 (1912).

(156) Pohl (Arch. exp. Pathol. Pharmacol., 1883, 40), found that 0.5 g. of acetone was necessary to produce convulsion in a cat, and 3-4 g. in the case of a large dog.

(157) Buchner, Fuchs and Neagle, Arch. Hyg. Münch., 40, 347 (1901).

(158) See Dujardin and Beaumets-Audige; Pohl; Bungers, Harnack; Hollander; Ball; Holden; Riche; Baudranl; Birch-Hirschfeld; Hunt; Atchinson; Lewin; and also De Schweinitz, "Toxic Amblyopias," p. 51 (1896).

(159) Buller and Wood, J. Am. Med. Assn., 1904; Holden, Arch. Augenhk., 40, 351.

(160) See Pohl; Bungers; Schotten; Greehaut and Quinquant; Harnack; Hollander.

(161) See Hunt; Buller and Wood; Stadelmann [Med. Press. and Circ., n. s., 93, 194 (1912)].

It is a matter of little practical importance as to whether *chemically pure* methyl alcohol is toxic or not, as economic reasons prohibit its extended use in the arts and manufacturing industries, although, as pointed out, the purest material is used in certain products. The numerous cases of poisoning prove beyond doubt that the methyl alcohol of commerce is decidedly toxic.

IMPORTANCE OF WOOD ALCOHOL AS A POISON.

History of Methyl Alcohol Poisoning.

The importance of methyl alcohol as a poison began with the introduction of the various "deodorized" grades on the market. Simultaneously with the advent of preparations like "Columbian spirits," "Colonial spirits," "Eagle spirits," etc. (162), a large number of poisoning cases began to be reported in the medical press.

First Cases Reported.

The first fatal case of wood-spirit poisoning reported occurred in London in 1869 and was described by Taylor (163), who also mentioned headache, nausea, sickness, etc., from the inhalation of the vapors. Ten years later, Viger and Menjin (164) reported two prisoners who drank wood alcohol; one died, the other became blind. McCoy and Mitchel (165), in 1898, gave the account of a case in this country; a young man became blind on drinking 60 cc. of methyl alcohol.

Number Increasing.

Beginning in 1899, the number of methyl alcohol poisoning cases increased to a great extent. In 1904, Buller and Wood (166), by sending inquiries to various practitioners throughout the United States, collected 314 serious cases of methyl alcohol intoxication (167). The great majority of these were the result of drinking some form of methylated spirits (168), inhalation form-

(162) Containing from 97-98 per cent. methyl alcohol.

(163) "Poisons," p. 659 (1875).

(164) L'annee med., 1877; Rec. Ophth., 1879, 636.

(165) N. Y. Med. Rec., 65, 28 (1898).

(166) J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904).

(167) Of these, 158 became blind, while in 156 instances death followed.

(168) The alcohol was taken in the forms of methyl alcohol, "Columbian spirits," "Jamaica ginger," essence of lemon and cinnamon, "Cologne spirits," and alcoholic mixtures containing methyl alcohol.

ing a second important source of the poisoning (169). The statistics gathered were far from complete, as Buller and Wood communicated with but a limited number of practitioners.

Toxic Action on Workmen Employing It.

The deleterious effects of methyl alcohol on workingmen employing it in the industries were prominently brought before the public in 1906, when, at a hearing (170) in the United States Congress, affidavits of 75 hat workers as to injury to eyesight and general health from wood alcohol used as a solvent for shellac (171), were submitted.

As an Adulterant.

In recent years the increased use of methyl alcohol as an adulterant in beverages, etc., has resulted in epidemics occurring in certain localities (172), of which the Sharnack (173) catastrophe in Berlin in 1911 was the most serious.

Number of Poisoning Cases.

We were able to collect over 700 cases (174) of methyl alcohol poisoning reported in the various medical periodicals. This is but a small percentage of the total number, as comparatively few practitioners report cases that come under their observation in the scientific press. Moreover, physicians often fail to recognize such industrial or occupational diseases because these often take the form of chronic poisoning, which shows itself in obscure diseases of the digestive apparatus and nervous system, and are attributed by the patients to other causes.

WHEN USED EXTERNALLY.

Channels Through Which the Poison May Enter the Circulation.

Poisons may enter the body by various channels. The mucous membranes of all parts of the body are absorbent, hence poisons

(169) The chief danger here lies in inhaling wood alcohol fumes and rebreathed air in a confined space; but when the fumes are diluted with a sufficient quantity of pure air, the inhalation is not dangerous to life or eyesight.

(170) Hearing before Ways and Means Committee, 59th Congress, 1st Session, Feb.-March, 1906.

(171) Used in the hat stiffening department.

(172) Koller (Med. Rec., 63, 10), reported 25 deaths in New York City in 1905 due to drinking whiskey adulterated with methyl alcohol. Kassas (Novoje Medicinshe, 1908, 357) and Sinkowitch (Kasan, Meditsinski J., 1908, 399) give an account of 47 wood alcohol poisoning cases in Russia in 1908.

(173) See Stadelmann and Magnus-Levy (Berl. Klin. Wochschr., 48, 193 (1912)) for a complete account.

(174) See pages 1004-07, 1007-1034, 1034-1042.

may operate toxically by contact with the mucous membrane of the nose, eye, vagina or rectum. The channels of entrance enumerated in the order of their importance are: the mouth and into the stomach; the air passages and lungs; the skin and cellular membrane; the blood vessels, including wounds; and the intestines.

When Externally Applied.

In 1875, Taylor (175) stated that poisons may be absorbed by the skin, the process depending upon the nature of the poison and upon the texture of the surface of the part to which they are applied. The following circumstances favor the absorption: removal of the cuticle, abrasions or wounds of the skin, when the substance acts chemically on the skin (176), and the solution of the poison in alcohol, ether, or chloroform. In general, poisoning through the skin is slower in appearing, but resembles poisoning through the stomach (177).

Diffusion of Liquids Through the Skin.

The skin, with its cuticle or epidermis intact, is pervious only to substances which are soluble both in lipoids and water (178); but, according to Lehmann (179), the degree of solubility need not be high, *e. g.*, nitrobenzene, which is sparingly soluble in water, is absorbed by the uninjured skin of the cat. Gallard (180) showed that after the immersion of the arms in 5 per cent. sodium iodide solution for a half-hour daily, the urine of the succeeding 24 hours contained 0.066-3.863 mg. of iodine; and Kahlenberg (181) proved that traces of boric acid appeared in the urine within 5 minutes and estimable quantities within 10 minutes, by immersion of the feet in a saturated solution of boric acid. According to Witthaus and Becker (182), the abraded skin, exposing the very vascular subcutaneous cellular tissue, becomes a very active absorbent surface, and solutions applied to it are, to all intents and purposes, under almost the same conditions as when hypodermically injected.

(175) "Poisons," p. 9 (1875).

(176) So as to soften or dissolve the cuticle and expose the cellular membrane beneath.

(177) For cases of poisoning through the skin, see *Ann. d'Hygiene*, 1850, 2, 437; 1848, 2, 131; 1859, 2, 29; 1867, 2, 194; *Lancet*, 1871, (1), 735, 805; (2), 537.

(178) Schwenkenbecher, *Arch. f. Ann. Physiol. Phys. Abt.*, 1904, 121.

(179) *Beitr. Z. Physiol. Path.*, cited by Hermann, 1908, 130.

(180) *Compt. rend.*, 1900, 858.

(181) *Proc. Am. Soc. Biol. Chem.*, 1, 118 (1908).

(182) "Medical Jurisprudence, Forensic Medicine and Toxicology," 4, p. 86 (1911).

Action of Methyl Alcohol on the Skin.

Some poisons act directly upon the skin, producing dermatitis, which, in a mild form, may be limited to a simple redness or erythema, attended with more or less itching, and going on to the formation of visicles, pustules, or bullæ, and, in extreme cases, even gangrene (183).

Raether (184) asserted that methyl alcohol had an irritative action on the skin, due to its property of absorbing water. Fawcitt (185) observed that when methyl alcohol got on the hands no peculiar sensation was experienced unless afterwards the hands were washed in cold water, when intense pain was felt between the fingers where the skin was tender.

Cases in Illustration.

Von Gall, president of the Hat Manufacturers' Association of Danbury and Bethel, Conn., observed, in the case of the operatives in the stiffening room in hat factories, that the wood alcohol acted upon them externally, but he remarked that the action was slower than when taken internally (186). The testimony of the Federal Hat Co. was submitted at a hearing before the United States Congress (187) that wood alcohol caused injury to the hands of their employees. The R. Dunlap Hat Co. (188) also testified that wood alcohol in shellac caused injury to the hands of their employees who immersed their hands in the poison during the process of stiffening. The *Painters' Magazine* of December, 1905, warned the trade of the dangers of wood alcohol through the absorption by the skin.

PUBLISHED CASES OF POISONING BY THE EXTERNAL
USE OF METHYL ALCOHOL.

Case No. 1 (189). J. J. McDonald, age 33, hat stiffener; employed in hat stiffening, using shellac, dissolved in wood alcohol, for seven years.

Result: Itchy rash on back of hands.

(183) See Witthaus and Becker, *loc. cit.*

(184) Dissertation, Tübingen, 1905.

(185) J. Soc. Chem. Ind., 22, 685.

(186) Hearing before Ways and Means Committee on "Free Alcohol, 1906.

(187) *Ibid.*

(188) *Ibid.*

(189) *Ibid.*

Case No. 2 (190). M. E. Connor, age 23, hat stiffener (Kings County Factory); employed at present occupation three years; wood alcohol is used to "cut" the shellac.

Result: Hands inflamed and itch.

Case No. 3 (191). J. W. Schenck, age 35, hat stiffener (Kings County); employed at stiffening for 10 years, using wood alcohol to dissolve the shellac.

Result: Arms and hands irritated.

Case No. 4 (192). A healthy woman, age 58, washed head and face with wood alcohol daily. No history of blindness.

Result: Vision became impaired; V.R.= 8/20; V.L.= 8/20.

Case No. 5 (193). A painter, age 39, used wood alcohol to wash varnish from hands every day after work.

Result: Became totally blind and has remained blind.

Case No. 6 (194). A distributor of paints and alcohol in store-room of paint factory, age 53, spilled a quart of wood alcohol on his feet and floor, and remained in same room for some hours.

Result: Became totally blind.

Case No. 7 (195). A photographer, age 32, cleaned plates with wood alcohol.

Result: Was seized with paralysis of arms and legs, pain in sides and decrease in sight. Died after some time.

(190, 191) Hearing before Ways and Means Committee, 59th Congress, 1st Session, Feb.-March, 1906.

(192) Conboy, J. Michigan Med. Soc., 3, 536.

(193) De Schweinitz, Ophth. Rec., 1901, 349.

(194) Phillips, *Idem*, 16, 538.

(195) Gifford, *Idem*, 16, 274.

CHAPTER V

INVESTIGATIONAL EVIDENCE AND RECOMMENDATIONS.

Hearings Before the United States Congress.

Until recently, the poisoning occurring among workmen in industries wherein wood alcohol is employed had received but meagre attention in this country. In 1906, due to a general agitation for a tax-free denatured alcohol, hearings were held on free alcohol before the Ways and Means and Finance Committees in the United States Congress (196). At these hearings the deleterious action of wood alcohol on the general health and eyesight of workingmen employing it in the industries was prominently brought before the public by the testimony of manufacturers, workingmen and experts. An abstracted account of the proceedings relative to wood alcohol follows.

STATEMENTS OF MANUFACTURERS.

Piano Manufacturers.

H. P. Mehlin, President of the National Piano Manufacturers' Association of America, testified that wood alcohol, as used in shellac and varnish in the manufacturing of pianos, was injurious to the health of the workingmen employing it.

Hat Manufacturers.

The Hat Manufacturers' Association was represented by Charles H. Merritt, Chairman of the Committee of the Fur Hat Manufacturers' Association of Danbury, Conn., who stated that competition forced them to employ wood alcohol in the hat industry, as it was much cheaper than grain alcohol; but its employment caused serious interruption to business on account of affecting the eyes and health of the operatives. In addition, he submitted the following statements from individual manufacturers:—

Crofut & Knapp Co. Wood alcohol is detrimental to the health of our employees. One man was obliged to give up work

(196) Hearing on Free Alcohol before the Ways and Means Committee, 59th Congress, 1st Session, Feb.-March, 1906.

entirely, owing to the effect on his eyes; several laid off temporarily for the same reason.

New Milford Hat Co. The use of wood alcohol has been detrimental to the health of our employees. It affects the eyesight of every man in the department.

It has necessitated the stopping of work by some men for days at a time.

Guyer Hat Co. The use of wood alcohol is detrimental to some extent; one man died from the effects.

Frank Shople Co. It is painful to the eyes of employees and injurious to their health. Our hat stiffeners are not able to work full time.

National Hat Co. It is detrimental to the health of the operatives. The men are obliged to stop work, sometimes for a day and frequently parts of days.

Seth Reed, one of our stiffeners, was disabled from the wood alcohol.

Hawes, Von Gal Co. It is detrimental to the health and eyesight of our employees in the hat stiffening department. Stiffening is stopped on the average one day a week. Dobbs, Maggersuppe, Arnold and Stevens were disabled from wood alcohol vapor.

David Higson Co. It is detrimental to the health and eyesight of our employees, and the men are blinded by fumes. It causes delay and some give up for good.

Bethel Manufacturing Co. It is detrimental to the health and eyesight of our employees. The men are unable to work 1-3 days at a time. Cases of disablement: Megnerey, Slade, Euvrard, and Judson.

Connet Hat Co. The wood alcohol is detrimental to the health and eyesight of our employees. The men are unable to work several days at a time. Specific cases of disablement: Brookes, Collins, Cooper, Keeler, and Neal.

Hoyt, Wolthansen Corporation. The wood alcohol causes blindness and delay of the work.

Federal Hat Co. Stiffeners become blind; the hands are irritated and itch.

Danbury Hat Co.; Millard Hat Co.; S. A. G. Hat Co.; H. M. Lachlan & Co.; John W. Green & Sons. Everyone who works in the room where the alcohol is used has trouble with his eyes.

Beltaire Bros. & Co. It is detrimental to the health of the operatives and causes delay.

Price and Vogt. It is detrimental to the health of our employees. Specific cases: Sherwood, Gustafson and Lane.

Bordt, Untiedt Co. The men were broken down in health; their eyes were almost ruined.

Judd & Dunning Hat Co.; J. Rummel & Co.; John B. Stetson Co. The eyes and stomachs of our employees are affected.

Edwin Short Hat Co.; R. Dunlap & Co. Causes blindness, and injured arms and hands.

James Marshall & Bro. Detrimental; causes delay.

Lee Hat Mfg. Co. Have to discontinue work at times.

S. C. Hollery & Co. All employees using wood alcohol have intense pain in eyes; have to use cocain to relieve pain.

Volk Hat Co. Detrimental; causes delay. Specific case: Andrews.

Judd & Co. It is detrimental to the health of the operatives and causes delay.

W. B. Hubbel. It is detrimental to the health of the employees and causes delay. Lamson and Hubbard had to give up work.

Van Gall, President of the Hat Manufacturers' Association of Danbury and Bethel, Conn., stated that wood alcohol vapors caused injury to the general health and eyesight of the employees. He asserted that wood alcohol acted externally just the same as

internally, only slower. On the other hand, the manufacturers of wood alcohol claimed that this alcohol acted as a poison only when taken internally, and that their employees were not affected by its vapors.

EVIDENCE SUBMITTED BY WORKMEN.

Evidence of Workmen.

The affidavits of 75 hat workers as to injury from wood alcohol, used as a solvent for shellac in hat stiffening, were submitted (197). All of these men complained of inflammation of the eyes, with intense pain, causing them to lay off from work at least one-third of the time. Other complaints were pain in the stomach, nausea, inflammation of the mucous membranes of the throat and nose, catarrh, headache, cough, nervous exhaustion, irritation and itching of the skin of arms and hands, etc. Also, two physicians' statements of injuries from using wood alcohol in the industries were submitted (198). These physicians reported seven cases in which the men were forced to discontinue work in the stiffening department owing to the effects of the wood alcohol on their eyesight and general health; and eight cases where the men were still employed in stiffening hats with shellac "cut" with wood alcohol and showed the deleterious effects of the alcohol. They stated that the action of the wood alcohol is constitutional. None of the above men used stimulants to excess and many used them in moderation.

Louis F. Mignory, a hat worker of Danbury, Conn., stated that wood alcohol fumes made him blind temporarily and that he considered it a crime to require a man to work with it. C. E. White, another hat worker, said that wood alcohol made him blind.

Painters.

Bedell, a painter from Lynn, Mass., testified that he was totally blind from using wood alcohol to clean furniture in a small room. Statements from three other painters who became blind from using wood alcohol were submitted.

(197) See Appendix A, p. 995, for affidavits.

(198) See Appendix B, p. 998.

EXPERT EVIDENCE.

Expert Evidence of C. A. Wood.

Casey A. Wood, Professor of Ophthalmology in the Chicago Post-Graduate Medical School, testified as to the injurious qualities of wood alcohol; he attributed the poisoning to:—

1. Drinking the methyl alcohol.

(a) Employees in factories using “Columbian spirits” and other forms of “deodorized” methyl alcohol are frequently tempted to drink the fluid. First, because the “deodorized” forms of methyl alcohol are hardly distinguishable by the layman from grain alcohol; and, second, methyl alcohol is an example of idiosyncrasy, just as in the case of some other poisons, some individuals being immune to it so far as permanent damage to the organism is concerned. Due to the above, employees become careless and drink the spirit.

(b) Drinking of methyl alcohol by soldiers, sailors, Indians, etc., who are unable to obtain grain alcohol easily.

(c) Adulteration of alcoholic beverages, alcoholic extracts, etc., with methyl alcohol, is still going on (199), and is responsible for more deaths and blindness than is brought about by all the other forms combined.

2. Inhaling methyl alcohol in a confined, badly ventilated space.

The chief danger here lies in inhaling wood alcohol fumes and rebreathed air in a confined space. Cases of blindness, etc., from the absorption of methyl alcohol by the lungs and skin are reported by Wood (200). If the wood alcohol fumes are diluted with a sufficient quantity of pure air, the inhalation is not dangerous to life and eyesight.

3. Using methyl alcohol for external use; washes, liniments, etc.

It is not always easy to detect some of the evil results of the poison on workers with methyl alcohol. The effects often take the

(199) Methyl alcohol exhibits its toxic properties whenever it is introduced into the human system in whatever form. Wood and Buller reported (Feb., 1908) 314 serious cases of methyl alcohol intoxication; of these, 158 became blind, while in 156 instances death followed. The general majority of these were the result of drinking some form of methylated spirits.

(200) J. Am. Med. Assn., Oct. 1-29, 1904; Internat. Clinic, 1906, 165; N. Y. Med. J., Jan. 7, 1906; Brit. Med. J., 1906, ii, 1855.

form of chronic poisoning, which shows itself in obscure diseases of the digestive organs and nervous system, and are attributed by the patients to other causes.

Wood's Recommendation.

Wood recommended a strict prohibition of the manufacture or sale of "deodorized" wood alcohol, and the substitution of an untaxed methylated spirit, corresponding to that of Great Britain, or the *Breunspiritus* of Germany, or a slightly taxed pure ethyl alcohol for commercial purposes.

As a result of a similar investigation, the following bill was proposed in the Austrian Reichstag in 1910:—

1. Wood alcohol is a poison, must be kept in sealed vessels, and sold by responsible persons. The vessels containing it should bear a label, "Poisonous, not to be used externally."

2. The use of methyl alcohol in foods, beverages, cosmetics, and medicinal preparations, is prohibited.

3. The technical use of methyl alcohol is to be limited so that it shall not be inhaled by workmen or their hands be in contact with it.

4. Wood alcohol should not be used as a denaturing substance for spirit; its place should be taken by a non-toxic preparation which will make the spirit undrinkable (201).

Prussia and Hungary, following the example set by Austria, prohibited the free sale of methyl alcohol in 1911 (202).

INDEPENDENT RECOMMENDATIONS.

Recommendations by Organizations.

At various times, individual experts and societies have recommended the limitation of the sale and use of methyl alcohol.

Thus, in 1906, at a meeting of the New England Ophthalmologic Society, a resolution was made that denatured alcohol should be used instead of wood alcohol, as the latter, on account of its poisonous properties, causes blindness of the workingmen employing it.

(201) Jaksch, *Amstsarzt.*, 2, 277(1910).

(202) *Vide* Chapter VI, p. 989.

The American Medical Association (Section Ophthal., 1905) passed a resolution calling upon the various State and Federal authorities to place wood alcohol preparations on the list of poisons.

Local Union 111 of the Brotherhood of Painters, Decorators and Paperhangers of America, in 1905, voted that the use of wood alcohol in paints, shellac, and varnish be prohibited, and the members were warned against the use of it (203).

Recommendations of Individuals.

H. W. Wiley (204) recommended that laws be passed prohibiting the use of methyl alcohol for internal and external purposes, and providing that labels be pasted on vessels containing it, advising people of its danger.

W. M. Carhart (205) recommended that workers using shellac or wood alcohol be permitted to leave their work at frequent intervals and to have much shorter hours of such work.

F. C. Godbold, President of the Louisiana Pharm. Assn. (1905), recommended the passage of stringent laws to prohibit the use of wood alcohol in Louisiana.

Thomas Tyrer (206) urged the lowering of duty on grain alcohol so that it could be used instead of wood alcohol.

Frank Buller (207) recommended that all wood alcohol preparations be labeled with "*This liquid taken internally is likely to cause blindness.*" He believed that such a statement would be more effective than the skull and cross-bones, as people are more afraid of blindness than of even death.

J. P. Atchinson (208) recommended the passage of a bill prohibiting the use of methyl alcohol for internal or external use as a beverage or medicine.

J. H. Ball (209) recommended that the government should control the production of methyl alcohol, making it obligatory that it be marketed in a form undrinkable and impossible to use in any way as a substitute for ethyl alcohol.

(203) Hawes, Boston Med. Surg. J., 153, 525 (1905).

(204) N. Y. Med. J., 80, 1009 (1904).

(205) Am. Med., 3, 176 (1908); Man. Eye and Ear Hosp. Rep., 10, 67 (1909).

(206) Chem. and Drug., May, 1912; Chem. News, July, 1912.

(207) Montreal Med. J., 33, 29.

(208) N. Y. State J. Med., 6, 127 (1905).

(209) Homeop. Eye, Ear and Throat J., 11, 325 (1905).

S. W. Abbott (210) recommended that a law be passed requiring all vessels containing wood alcohol to be labeled "Poison" and to be sold by licensed pharmacists who should record each sale.

C. Koller (211) recommended that a law be passed forbidding the use of methyl alcohol in "essences" and proprietary medicines which might be the means of poisoning persons not addicted to the use of intoxicating drinks and who were entirely ignorant of the dangers to which they were exposed.

Reid Hunt (212) attributed the large number of methyl alcohol poisoning cases in the last few years to the fact that wood alcohol was frequently used as a substitute for ethyl alcohol, viz., in the arts (as varnishes, etc.), for external use (as bay rum), and in medicinal or flavoring agents ("essence of Jamaica ginger," peppermint, etc.)

Recent Inspection in the State of New York.

Under the authorization of the Factory Investigating Commission of the State of New York, a number of wood distillation plants, refineries, and establishments wherein the processes involved the use of wood alcohol, were inspected by Dr. George M. Price, Dr. F. E. Breithut, who acted as chemical advisor, and Miss Grace Potter. The results of this inspection, which are presented in full in a separate report by Dr. Price, substantiate the main evidence and support the principal recommendations given above.

(210) Boston Med. Surg. J., 1903, 63.

(211) Mt. Sinai Hosp. Rep., 4, 376 (1905).

(212) J. Hopkins Bull., 1902, 13, 213; Ophth. Rec., 1903, 34.

CHAPTER VI

LEGISLATION PERTAINING TO METHYL ALCOHOL.

This subject may be conveniently divided as follows:—

1. Legislation in the United States.
 - (1) Federal Acts and Regulations.
 - (2) State Laws.
 - (3) Municipal Ordinances.
 2. Legislation in Certain Foreign Countries.
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1. LEGISLATION IN THE UNITED STATES.

(1) FEDERAL ACTS AND REGULATIONS.

(a) Concerning the Use of Denatured Alcohol.

The United States Prohibits the Use of Denatured Alcohol as a Beverage or in Liquid Medicinal Preparations.

Section 1. From January 1, 1907, domestic alcohol may be withdrawn from bond without the payment of internal revenue tax, for the use in the arts and industries, and for fuel, light, and power, provided said alcohol shall have been mixed, in the presence of a Government officer, after withdrawal from the distillery warehouse, with *methyl alcohol*, or other denaturing material or materials, which will destroy its character as a beverage and render it unfit for liquid medicinal preparations. (Regulations as to the denaturation are given.)

Section 60. Any one using denatured alcohol for the manufacture of any beverage or liquid medicinal preparation, or who knowingly sells any beverage or liquid medicinal preparation, made in whole or in part from such alcohol, becomes subject to

the penalties prescribed in Section 2 of the Act of June 7, 1906 (*q. v.*).

(*Federal Statutes*, Act of June 7, 1906, Chap. 3047, 34 Stat. L. 217.)

(b) The Adulteration and Misbranding of Foods.

Federal Food Law.

The term "food," as used in the Federal Food and Drugs Act (213), includes all articles used for food, drink, confectionery or condiment by man or other animals, whether simple, mixed or compound. According to the Act, food is deemed to be adulterated if any substance has been mixed with or packed with it so as to reduce or lower or injuriously affect its quality or strength; if any substance has been substituted, wholly or in part, for the article; if any valuable constituent of the article has been wholly or in part abstracted; or if it contain added poisonous or other added deleterious ingredient which may render such article injurious to health.

Food is deemed to be misbranded if it be an imitation of or offered for sale under the distinctive name of another article; if it be labelled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when not so, or when the contents of the package as originally put up shall have been removed in whole or in part and other contents shall have been placed in such package.

RELEVANT JUDGMENTS UNDER THE ACT.

Methyl Alcohol in Flavors.

Judgment No. 277, Food and Drugs Act, relates to a case of adulteration and misbranding of lemon flavor. It was charged that the product was adulterated within the meaning of the Act, in that it contained an added *poisonous* ingredient, namely, methyl alcohol. (F. & D. No. 909; I. S. No. 10376-a, issued May 6, 1910.)

(213) For further particulars concerning the Federal Food and Drugs Act, see Chapter 3915, Public Acts of the 59th Congress of the United States, p. 768: *United States Statutes at Large*, vol. 34, 1. This Act was approved June 30, 1906, and amended in 1912.

Judgment No. 627, Food and Drugs Act, pertains to a case of adulteration of lemon flavor. It was charged that the product was adulterated, in that it consisted of a highly dilute solution of citral in methyl alcohol, etc. (F. & D. No. 1618; I. S. No. 10398-b, issued November 12, 1910.)

Bitters.

Judgment No. 1284, Food and Drugs Act, pertains to a case of adulteration and misbranding of a bitters, and to a case of misbranding of another bitters. Adulteration was alleged in the information against the first product, because it contained an added *poisonous and deleterious* ingredient which might render such article injurious to health, to-wit, methyl alcohol, which methyl alcohol was not a preservative applied externally in the preparation of the said article for shipment. In the second case misbranding was alleged, because the product was labelled so as to mislead the purchaser, in that . . . said label bore no statement of the quantity or proportion of alcohol contained therein. In these two cases of bitters, the first contained 33.6 per cent. of total alcohol by volume, of which about 2.9 per cent. was methyl alcohol; and the second contained 47.44 per cent. of total alcohol by volume, of which 6.4 per cent. was methyl alcohol. (F. & D. No. 2158; I. S. Nos. 1477-c and 1478-c, issued April 4, 1912.)

Liqueurs.

Judgment No. 1703, Food and Drugs Act, refers to a case of adulteration of a liqueur. The product contained an added *poisonous and deleterious* ingredient, to-wit, wood alcohol, which rendered it injurious to health. (F. & D. No. 3621; S. No. 1330, issued October 17, 1912.)

Judgment No. 1704, Food and Drugs Act, relates to the adulteration of a liqueur. Adulteration was alleged in the libel for the reason that the product contained an added *poisonous and deleterious* ingredient, to-wit, wood alcohol, which rendered it injurious to health. (F. & D. No. 3612, S. No. 1327, issued October 17, 1912. See also F. & D. No. 3640; I. S. No. 18713-d; Judgment No. 1754.)

(c) The Adulteration and Misbranding of Drugs.

Federal Drug Law.

The term "drug," as used in the Act, includes all medicines and preparations recognized in the "United States Pharmacopoeia" or "National Formulary," for internal or external use, and any substance or mixture of substances intended to be used for the cure, mitigation, or prevention of diseases of either man or other animals.

When a drug is sold under or by a name recognized in the "United States Pharmacopoeia" or "National Formulary," it is deemed to be adulterated if it differs from the standard of strength, quality, or purity as determined by the tests laid down in the "United States Pharmacopoeia" or "National Formulary" official at the time of the investigation: Provided, that no drug defined in the "United States Pharmacopoeia" or "National Formulary" shall be deemed to be adulterated under this provision if the standard of strength, quality, or purity be plainly stated upon the bottle, box, or other container thereof, although the standard may differ from that determined by the tests laid down in the "United States Pharmacopoeia" or "National Formulary."

A drug is also deemed to be adulterated if its strength or purity fall below the professed standard or quality under which it is sold.

A drug is deemed to be misbranded if it be in imitation of or offered for sale under the name of another article; if the contents of the package as originally put up shall have been removed, in whole or in part, and other contents shall have been placed in such package; or if the package fail to bear a statement on the label of the quantity of *any alcohol* present therein. To quote from Section 8, Drugs, Second:

A drug shall be deemed to be misbranded, . . . if the package fail to bear a statement on the label of the quantity or proportion of any alcohol . . . or of any derivative or preparation of any such substances contained therein.

(On the standards for drugs, see Section 7 of Regulation 7.)

For cases in point, see *United States v. Knowlton Danderine Co.*, 170 Fed., 449; 175 Fed., 1022; *United States v. American Druggists Syndicate*, 186 Fed., 387.

Meaning of the Term Alcohol.

In the Federal and Drugs Act, the term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs, except as provided in the "United States Pharmacopoeia," or "National Formulary" (Regulation 28, a).

RELEVANT JUDGMENTS UNDER THE ACT.

Hair Tonics.

Judgment No. 319, Food and Drugs Act, refers to the misbranding of hair tonics. The hair tonic examined was stated to contain "pure Columbian Spirit;" it was held to be misbranded in that it contained 98.5 per cent of methyl alcohol, and failed to bear a statement of the quantity or proportion of the alcohol contained therein on the label. (F. & D. No. 721; I. S. No. 17580-a, issued May 26, 1910.)

Judgment No. 1673, Food and Drugs Act, pertains to the misbranding of a hair tonic, wherein the allegation was made for the reason that the product failed to bear a statement upon the label as to the quantity of alcohol contained therein. (F. & D. No. 2229; I. S. Nos. 5970-c, 5971-c, issued September 27, 1912.)

On the declaration of the quantity or proportion of alcohol present in drug products, see also F. I. D. Nos. 54, 57, 63, 85, and 94; the above are given merely as typical cases in point.

(2) STATE LAWS.

Special Laws Not Enacted in Some States.

In this sub-section, statutes and State regulations relating to the manufacture, sale and use of methyl alcohol, and of preparations containing methyl alcohol, are given. In general, it may be said that only those statutes are included which differ, wholly or in part, from the Federal Food and Drugs Act; but it should be borne in mind that, speaking broadly, most statutes have been based upon the Federal Act, and that the latter initiated legislation in this direction in the majority of the States.

Federal rules, regulations, and definitions apply in Delaware (*Laws of 1907*, Chapter 160), Nevada (*Laws of 1909*, Chapter 101; *Revised Laws*, 1912), South Dakota, and Texas. In Arkansas, Federal regulations likewise apply, and the Food and

Drugs Act is modeled after the Federal Act (see *Supplement to Kirby's Digest*, 1911); and in California, Missouri, Nebraska, and Rhode Island, the provisions and regulations are similar to the Federal regulations. The laws of these States are not included in the following digest.

Alabama.

Alabama Prohibits the Sale of Any Preparation or Product Containing Methyl Alcohol Intended for Internal or External Consumption.

It shall be unlawful to sell, offer, or expose for sale, or otherwise dispose of or have in possession, any preparation or product intended for the use of man, either for internal or external purposes, which contains methyl alcohol or wood spirits.

[*Code of Alabama (Criminal)*, 1907, Sec. 7554.]

Colorado.

Colorado Prohibits the Use of Wood Alcohol in Preparations for Internal and External Human Use.

The use of the "very poisonous" methyl alcohol (wood alcohol, Colonial or Columbian Spirit), is prohibited in all preparations for internal or external use, as regards the human body. This prohibition includes extracts, beverages, washes, perfumes, cosmetics, etc.

(NOTE: Federal rules and regulations apply to drugs containing wood or methyl alcohol, so far as applicable.)

(The Food and Drugs Act of 1908; Chapter 1, *Session Laws of 1907*; Chapter 1, Sections 1-10, *Revised Statutes of 1908*; Vol. 2, Chapter 1, Sections 1-10, *Annotated Statutes of 1911*.)

Connecticut.

Connecticut Provides that all Vessels Containing Methyl Alcohol be Labelled "Poison." (Exception is made in Case of Practising Physicians, Licensed Pharmacists who sell it Wholesale, and for use in Manufacture or for the Arts).

Be it enacted by the Senate and House of Representatives in General Assembly Convened:

Section 4734 of the *General Statutes* is hereby amended by adding at the end of Schedule A, accompanying said Section, the words

“wood or methylic alcohol under any name or in any mixture,” so that said section as amended shall read as follows: “Every person who shall sell any of the articles named in the schedule accompanying this schedule, marked Schedule A, except when prescribed by a practising physician, or sold at wholesale to licensed pharmacists, or for use in manufacture or for the arts, shall label the bottle, box or wrapper containing any such article with a label upon which shall be plainly written or printed the word ‘poison,’ and any person violating the provisions of this section shall be fined one dollar. *Schedule A:—Acid Carbohc, Ammoniated Mercury, Hydrochloric Acid, Chloroform, Nitric Acid, etc., Wood or Methylic Alcohol under any name or in any mixture.*”

(*Public Acts of Connecticut, 1905, Sec. 4734, p. 298.*)

Connecticut Prohibits the use of Wood Alcohol in Food and Drugs, Except as Specified in the “U. S. Pharmacopoeia” or “National Formulary.”

The term “alcohol” is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of food products or of drugs, except as specified in the “United States Pharmacopoeia” or “National Formulary.”

(The Food and Drugs Act of 1907; Chapter 255, *Public Acts of 1907*; amended by Chapter 178, *Public Acts of 1909.*)

Florida.

Florida Requires that all Food and Drugs Shall be Labelled Stating the Quantity and Proportion of any Alcohol Contained Therein.

An article of food shall be deemed to be misbranded, . . . if (it) fail to bear a statement on the label in conspicuous letters of the quantity or proportion of any alcohol. . . .

(Section 5, *Food, Second.*)

A drug or food product is misbranded in case it fails to bear a statement on the label in conspicuous letters of the quantity or proportion of any alcohol. . . .

(Regulation 28, c.)

No Alcohol Except Ethyl Alcohol shall be Used in Drugs or Food, Except as Provided in the "U. S. Pharmacopoeia" or "National Formulary."

The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs or foods except as specified in the "United States Pharmacopoeia" or "National Formulary."

(Regulation 28, A.)

(On the Pure Food and Drugs Law of Florida, see Chapter 6122, *Acts of 1911*; modeled after the Federal Law.)

Georgia.

Georgia Prohibits the Sale of Wood or Denatured Alcohol, Except by Licensed Druggists, for use in the Arts, or for Scientific and Mechanical Purposes.

Nothing in the preceding sections of this article shall prohibit the sale, by licensed druggists, of wood or denatured alcohol for art, scientific or mechanical purposes.

(*Code of the State of Georgia, 1911, Sec. 431, Art. 14.*)

Definition of "Alcohol."

The term alcohol is defined to mean ethyl alcohol, of the degree of refinement in the "U. S. Pharmacopoeia."

(*Ruling 16, 6, the Drugs Act.*)

Idaho.

Idaho Deems any Article of Food to be Adulterated if it Contains any Wood Alcohol.

That, for the purpose of this Act, an article shall be deemed to be adulterated:—

In case of Food:

7. If it contains methyl or wood alcohol or any of its forms.

(Bull. No. 9, pp. 5-6, of the Dept. of Foods, Drugs and Hotel Inspection, Boise, Idaho, May, 1911; *Laws of 1911, Chap. 196*; House Bill No. 213, Section 5.)

*Illinois.**Illinois Prohibits the Use of Wood Alcohol in Drinks.*

No person shall, within this State, by himself, his agent, or servant, or as a servant or agent of any other person or corporation, manufacture, brew, distil, have or offer for sale, or sell any spirituous or fermented or malt liquor, containing any drug, substance, or ingredient not healthful or not normally existing in said spirituous, fermented or malt liquor, or which may be deleterious or detrimental to health when liquors are used as a beverage, and the following drugs, substances, or ingredients shall be deemed to be not healthful and shall be deemed to be deleterious or detrimental to health when contained in such liquors, to-wit . . . *methyl alcohol and its derivatives.*

(Section 14, Chapter 127b, *Revised Statutes of 1911.*)

Penalty.

Whoever adulterates, for the purpose of sale, any liquor used or intended for drink with . . . substances which are poisonous or injurious to health; and whoever sells or offers or keeps for sale any such liquor so adulterated, shall be confined in the county jail not exceeding one year, or fined not exceeding one thousand dollars, or both.

(Section 8, Chapter 38, *Revised Statutes of 1911.*)

Illinois Provides That No Food, Drink or Medicine Shall be Mixed With Other Substances Unless they Bear a Notice to This Effect on the Label.

No person shall mix . . . any article of food, drink or medicine, or any article which enters into the composition of food, drink or medicine, with any other ingredient or material, whether injurious to health or not, for the purpose of gain or profit, or sell, or offer the same for sale, or order, or permit any other person to sell or offer for sale any article so mixed . . . , unless the same be so manufactured, used or sold or offered for sale under its true and appropriate name, and notice that the same is mixed or impure is marked, printed or stamped upon each package, roll, parcel or vessel containing the same, so as to be and remain at all times readily visible, or unless the per-

son purchasing the same is fully informed by the seller of the true name and ingredient (if other than such as are known by the common name thereof) of such article of food, drink or medicine, at the time of making sale thereof or offering to sell the same.

(Section 9j, Chapter 38, *Revised Statutes of 1911.*)

Iowa.

Iowa Prohibits the Sale of Any Preparations Containing Wood Alcohol for the Use of Man or Domestic Animals, Internally or Externally.

No person, firm or corporation shall sell, offer or expose for sale, or have in his possession any preparation or product intended for the use of man or domestic animals, either for internal or external use, or for cosmetic purposes, or for inhalation, or for perfumes, which contain methyl (wood) alcohol, crude or refined, or denatured alcohol.

(Sec. 4999-a 36, Chap. 10-b, *Suppl. to Code, 1907.*)

Iowa Excludes Denatured Alcohol from the List of Poisons, Removing it from the Statutes Relating to the Sale and Handling of Poisonous Substances (1909).

That the law as it appears in Section 2593 of the *Supplement to the Code, 1907*, be amended by striking from line nine thereof the words "denatured alcohol."

Denatured alcohol shall not be deemed to be a poison within the meaning of the statutes relating to the sale or handling of poisons.

(*Laws of Iowa*, Chapter 162, Section 1, 1909, 33 C. A.)

Kansas.

Kansas Prohibits the Use of Wood Alcohol in Pharmacy, Except as Provided in the "U. S. Pharmacopoeia" or "National Formulary."

The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs, except as specified in "The United States Pharmacopoeia" or "National Formulary."

(*Pharmacy Law, 1909*, Chap. 8095.)

*Kentucky.**Kentucky Prohibits the Use of Wood Alcohol in Drugs, Except as Provided in Reg. 9.*

The term "alcohol" is defined to mean ethyl alcohol, of the degree of refinement required in the Pharmacopoeia. No other kind of alcohol is permissible in the manufacture of drugs, except as specified in Regulation 9.

(Regulation 9, *Acts of 1908*, amended by *Acts of 1910*.)

It has been found by the inspector that the dealers have been using what is known as commercial alcohol in the manufacturing of drugs. Commercial alcohol does not meet the requirements of the Pharmacopoeia for freedom from aldehyde and fusel oil, and under the law can not be used. The dealer should insist that the wholesaler or jobber supply him with the United States Pharmacopoeial alcohol. (Bulletin No. 144.)

*Louisiana.**Louisiana Prohibits the Use of Wood Alcohol in Drugs, Except as Provided in the "U. S. Pharmacopoeia."*

The use of methyl alcohol, refined or otherwise, in the manufacture of drugs, is prohibited, except as provided in the "United States Pharmacopoeia."

(Secretary of the State Board of Health.)

No other kind of alcohol than ethyl alcohol is permissible in the manufacture of drugs, foods, liquors, or waters, except as specified in the "United States Pharmacopoeia" or "National Formulary."

(Act No. 98, *Acts of 1906*.)

*Maryland.**Maryland Prohibits the Use of Methyl Alcohol in Flavoring Extracts, Essences and Fluids Used for Flavoring Articles of Food or Drink.*

No person, firm or corporation engaged in making, manufacturing, compounding and selling extracts, essences, or other fluids commonly used for the purpose of flavoring articles of food or drink, shall use or employ, or permit to be used or employed

by his, their or its agents or employees, in the making, manufacturing or compounding of such flavoring extracts, essences or fluids any *methyl* or *wood alcohol*; nor shall any person, firm, or corporation, his, their or its agents or employees, sell or offer for sale at wholesale or retail, any flavoring extracts, essence, or other fluid commonly used for flavoring articles of food or drink, when the same contains any *methyl* or *wood alcohol*; and any person, firm or corporation, his, their, or its agents, employees or officers, violating the provisions of this section shall be guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine of not less than \$100 nor more than \$500, or by not less than three months nor more than twelve months imprisonment, or both, in the discretion of the court.

(*Annotated Code of Maryland*, 1, 1125; Section 159.)

Massachusetts.

Massachusetts Requires the Labeling of All Vessels Containing Wood Alcohol, and Prohibits its Use in Food, Drink, or Drug Intended for Internal Use.

Chap. 541, Sec. 1, Wood Alcohol Act, 1910.—Whoever, himself, or by his servant or agent, or as the servant or agent of any other person, sells, exchanges, or delivers any wood alcohol (*methyl alcohol*), either crude or refined, or denatured alcohol, under or by whatever name or trade mark the same may be called or known, shall affix to the bottle or vessel containing same a label bearing the words "Poison, not for internal use," in red letters of uncondensed Gothic type, not less than one-quarter of an inch in height, and the same words "Poison, not for internal use" in stencilled letters of similar Gothic type of a size not less than three-quarter inch nor more than one and one-half inches in height for use on barrels and kegs. Whoever violates any provision of this section shall pay a fine of not less than \$50 nor more than \$200 for each sale in respect to which the violation occurs.

Sec. 2. Whoever, himself, or by his servant or agent, or as the servant or agent of another person, sells, exchanges, or delivers, or has in his possession with intentions to sell, exchange or deliver, any article of food, or drink, or any drug intended for

internal use, containing any wood alcohol (*methyl alcohol*), either crude or refined, under whatever name or trade mark the same may be called or known, shall be punished by a fine of not less than \$200, or by imprisonment of not more than thirty days, or both such fine and imprisonment.

Sec. 3, Chapter 220 of 1905, relative to wood alcohol is hereby repealed. For information, said chapter is given below.

(*Acts and Resolves of Massachusetts, 1910, p. 494.*)

The Law of 1905.

Chap. 220, Sec. 1, Wood Alcohol Act, 1905.—Whoever, himself, or by his servant or agent, or as the servant or agent of any other person, sells, exchanges, or delivers any wood alcohol, otherwise known as methyl alcohol, shall affix to the vessel containing the same and shall deliver therewith a label bearing the words "Wood Alcohol, Poison" in black letters of uncondensed Gothic type not less than one-quarter inch in height. Whoever violates the provisions of this section shall pay a fine of not less than \$50 nor more than \$200.

Sec. 2. Whoever, by himself, or by his servant or agent or any other person, sells, exchanges or delivers, or has in his possession with intent to sell, exchange or deliver, any article of food or drink, or any drug intended for internal use, containing any wood alcohol, otherwise known as methyl alcohol, shall be punished by a fine of not less than \$200, or by imprisonment for not more than thirty days, or by both such fine and imprisonment.

(*Revised Laws of Massachusetts, 1905, 220, Sec. 1.*)

Michigan.

Michigan. General Regulations as to the Adulteration of Food.

An article of food shall be deemed to be adulterated if it contains any added substances or ingredient which is poisonous or injurious to health: . . . Substantially similar to the Federal Law.

(Section 3, Seventh, Act No. 193, *Public Acts 1895*, amended by Act No. 118, *Public Acts 1897.*)

Statement of the Detroit Board of Health.

The Director of the Laboratory of the Board of Health of Detroit, Michigan, informs the author that the use of methyl alcohol in any food is forbidden in Michigan, and that its employment in the manufacture or preparation of drugs is only permitted where it is stipulated by the Pharmacopoeia or "National Formulary."

*Minnesota.**Minnesota Requires the Labeling of All Vessels Containing Wood Alcohol with the Words "Wood Naphtha," "Poison."*

Section 1780.—1. No person, by himself, his servant or agent, or as the servant or agent of another person or persons, shall sell, exchange, deliver, or have in his custody or possession with intent to sell, exchange or deliver, or expose or offer for sale, exchange or deliver, any wood alcohol, or substance commonly known as wood alcohol, unless each bottle, package, cask, can or receptacle containing the said wood alcohol shall be plainly marked, stamped, branded or labelled on the outside and face of each package, bottle, cask, can, or receptacle of the capacity less than one gallon, in legible type not smaller than large primer, and over the outside and face of each package, bottle, can or receptacle of the capacity of one gallon or more, in legible letters not less than one inch in length, the letters and words "Wood Naphtha," "Poison."

(Chap. 35, Sec. 1, 1905.)

2. Any person violating the provisions of this act shall be deemed guilty of a misdemeanor and be punished by a fine of not less than \$50 and not more than \$100 for each and every offense, or by imprisonment in the county jail for not less than thirty days or more than ninety days.

(*Revised Laws of Minnesota, 1905, Chap. 35, Sec. 1.*)

Minnesota Prohibits the Use of Wood Alcohol in Drinks.

No person shall make, brew, distil, sell or serve, in any form, any adulterated, spirituous, fermented or distilled liquor, and

any such liquor shall be deemed adulterated if it contains any of the following named substances . . . *methyl alcohol, or derivatives therefrom.*

(Section 1759, Chapter 21, *Revised Laws of 1905.*)

General Regulations as to the Adulteration of Foods, Drugs and Medicines.

Every person who, with intent that the same may be sold as unadulterated or undiluted, shall adulterate or dilute, wine, milk, distilled spirits, malt liquors, or any drug, medicine, food, or drink for man or beast; or shall offer for sale or sell the same as unadulterated or undiluted, or without disclosing to or informing the purchaser that the same has been adulterated or diluted; or shall manufacture, sell, expose, or offer for sale, such article of food, or drink, any substance in imitation thereof, without disclosing the imitation by a suitable and plainly visible mark or brand; or with intent that the same may be used as food, drink, or medicine, shall sell, offer or expose for sale, any article whatsoever which to his knowledge has become spoiled, tainted or for any cause unfit to be used as food, drink, or medicine, where special provision has not otherwise been made by statute for its punishment, shall be guilty of a misdemeanor, and punished by a fine of not less than twenty-five dollars or by imprisonment in the county jail for not less than thirty days.

(Section 4993, Chapter 99, *Revised Laws of 1905.*)

Montana.

Montana Requires the Labeling of Bottles Containing Wood Alcohol.

It shall be unlawful for any person, firm or corporation to retail any of the following named poisons, to-wit: . . . *wood alcohol*; without labeling the box, bottle, or other receptacle in which the said poisons are contained with the name of the article and the word "Poison," and the name and place of business of the seller.

(*Code of Montana, 1907.*)

New Hampshire.

New Hampshire Prohibits the Sale of any Food, Drink or Drug Intended for Internal Use Containing Wood Alcohol, and Requires that All Vessels Containing Wood Alcohol be Labelled with the Words "Poison, not for Internal Use."

Section 1. Whoever, by himself, or by his servant, or agent, or as the servant or agent of another person, sells, exchanges or delivers any wood alcohol, otherwise known as methyl alcohol, either crude or refined, or denatured alcohol which contains methyl alcohol, under whatever name or trade mark the same may be called or known, shall affix to the bottle or vessel containing same, a label bearing the words "Poison, not for internal use" in stencilled letters of a similar Gothic type of a size not less than three-quarter of an inch nor more than one and one-half inches in height for use on barrels and kegs. Whoever violates any provision of this section shall pay a fine of not less than \$50 nor more than \$200 for each sale in respect to which the violation occurs.

Section 2. Whoever, himself, etc., sells, etc., any article of food or drink or any drug intended for internal use, containing any wood alcohol (*methyl alcohol*), either crude or refined, under whatever name or trade mark the same may be called or known, shall be punished by a fine of not less than \$200, or by imprisonment for not more than thirty days, or by both such fine and imprisonment.

(*Laws of New Hampshire*, Feb., 1911, Chapter 16, p. 17.)

New Jersey.

New Jersey Prohibits the Sale of Any Preparation Intended for Internal or External Use Containing Methyl Alcohol. (An Exception is Made in Case of Properly Labelled Veterinary Medicine Containing Methyl Alcohol).

Chapter 286, *Wood Alcohol Act*, 1912.—No person shall sell, etc., any food, drug, preparation, or mixture of any kind whatsoever, intended for internal use, which contains methyl or wood alcohol. Nor shall any person sell, or offer or expose for sale, or have in his possession, with intent to distribute or sell, or

use upon or apply to the body of another, any drug, hair tonic, bay rum or similar preparation, intended for external use, which contains methyl or wood alcohol, provided, however, that nothing in this section shall apply to veterinary medicines containing methyl or wood alcohol, when such remedies are plainly and distinctly labelled in such a manner as to indicate that they are intended solely for external use on animals.

(*Laws of New Jersey*, April 1, 1912, p. 509.)

New York.

New York Prohibits the Manufacture and Sale of any Substance Containing Methyl Alcohol, or any Methylated Preparations Made from it, for Use in Foods.

Article 8, Agricultural Law 201, 1909.—200. No person, firm, association or corporation shall within this State manufacture, produce, sell, offer or expose for sale any article of food which is misbranded within the meaning of this article.

201. Definition of adulterated or misbranded food:—An article of food shall be deemed to be adulterated if it contains *methyl or wood alcohol*, in any of its forms, or any methylated preparation made from it.

(*Consolidated Laws of the State of New York; Laws of 1909*, Chap. 9, Art. 8.)

Any Drink is Deemed to be Adulterated if it Contains Methyl Alcohol.

An article shall be deemed to be adulterated . . . in the case of spirituous, fermented and malt liquors, if it contain *methyl or wood alcohol* in any of its forms, . . .

(Section 41, Article 4, Chapter 49, *Laws of 1909*.)

A Drug is Deemed to be Adulterated if it Contains Methyl Alcohol, Except Veterinary Medicine for External Use Which Must Bear a Label to that Effect.

A drug is adulterated, (if) it contains *methyl or wood alcohol* when intended for use as a medicine, except when sold as a veterinary liniment for external use only and so labelled.

(Section 237, *Adult.*, 6, Article 11, Chapter 49, *Laws of 1909*; amended Chapter 422, *Laws of 1910*.)

North Carolina.

North Carolina Prohibits the Sale of Spirituous Liquor to be Used as a Beverage Containing Poisonous Properties.

Manufacturing and selling spirituous liquor to be used as a beverage containing poisonous properties is a misdemeanor punishable by not less than 5 years and a fine, at the discretion of the court.

(*Pell's Revisal, 1908.*)

An Article of Food is Adulterated if it Contains Wood Alcohol.

An article of food shall be deemed to be adulterated, if it contains any added poisonous or other added deleterious ingredient which may render such article injurious to health. If it contains any of the following substances which are hereby declared deleterious and dangerous to health when added to human food, to-wit:
. . . wood alcohol.

(Section 6, Food and Drugs Act, amended Chapter 900, *Laws of 1909.*)

North Dakota.

North Dakota Prohibits the Use of Methyl Alcohol, Either for Internal or External Purposes, Including Washes and Perfumes.

Chap. 196, "Pure Drugs Act."—It shall be unlawful to sell, offer or expose for sale, or to have in possession, any preparation or product intended for the use of man, either for internal or external purposes, including washes and perfumes, which contains methyl alcohol or wood spirits.

(H. B. No. 84—*Treat, 1907, p. 320; Laws of 1907, Chap. 196, Sec. 6.*)

Ohio.

Ohio Considers any Food, Drink, Confectionery, Condiment, Flavoring Extract, or Drug as Adulterated if it Contains any Methyl Alcohol.

Chap. 1, Sec. 5777.—A drug is adulterated within the meaning of this chapter (6) if it contains any methyl or wood alcohol.

Section 5778.—Food, drink, confectionery, or condiments are adulterated within the meaning of this chapter (11) if they contain any *methyl or wood alcohol*.

Section 5779.—A flavoring extract is adulterated within the meaning of this chapter (8) if it contains any *methyl or wood alcohol*.

(*General Code of Ohio, 1910.*)

Oklahoma.

Oklahoma Prohibits the Use of Wood Alcohol in Drugs, Except as Specified in the "United States Pharmacopoeia."

The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs, except as specified in the "United States Pharmacopoeia" or in the "National Formulary."

(*Food and Drugs Law, 1909, Chap. 18, Rule 34.*)

Pennsylvania.

Pennsylvania Deems any Drug Adulterated if it Contains Methyl Alcohol. Adulteration of Foods.

Any drug containing *methyl alcohol* (wood alcohol) will be regarded as adulterated within the meaning of this act (Adopted 1910.)

(Rule No. 6, The Drugs Act, *Laws of 1909 and 1911.*)

An article of food shall be deemed to be adulterated, if it contains any added . . . ingredients deleterious to health.

(Section 3, Fifth, Act No. 292, *Laws of 1909.*)

South Carolina.

South Carolina Prohibits the Use of Methyl Alcohol as a Beverage or for Medicinal Purposes.

Section 1. An Act — Making lawful the manufacture within the State of ethyl and methyl alcohol from sawdust, slabs, or any other wood substance.

Section 2.—No alcohol manufactured under the provisions of this act shall ever be used either within or without this State as a beverage or for medicinal purposes. (1910, No. 290, p. 570.)

Section 10.— Nothing in the act prohibiting the sale of alcoholic liquors shall prevent the sale of wood or denatured alcohol.
(*Laws of South Carolina, 1909, No. 42.*)

Virginia.

Virginia Prohibits the Sale of Wood Alcohol as a Beverage.

Nothing in this section shall be construed as licensing any person, firm, or corporation to sell *wood alcohol*, or any mixture thereof, as a beverage; and the sale of such *wood alcohol*, or mixture thereof, as a beverage is hereby prohibited.

(*Virginia Code Annotated, Pollard, 1904; Liquor License, Cl. 141, p. 2262.*)

Virginia Prohibits the Use of Wood Alcohol in Drugs, Except as Specified in the "U. S. Pharmacopoeia" or "National Formulary."

The term "alcohol" is defined to mean common or ethyl alcohol. No other kind of alcohol is permissible in the manufacture of drugs, except as specified in the "United States Pharmacopoeia" or "National Formulary."

(*Rules and Regulations of the Virginia Board of Pharmacy, March 14, 1908; Pharmacy & Drugs Act, Chap. 291, Acts of 1908; Code, Suppl. of 1910, p. 815.*)

Wisconsin.

Wisconsin Prohibits the Use of Wood Alcohol as a Solvent for Shellac, etc., Within any Vat or Tank so as to Injure or Endanger the Life of the Person so Using It.

No person, firm, or corporation shall require or wilfully permit the use of *wood alcohol*, or shellac or other materials dissolved in or mixed with *wood alcohol*, or "Columbian spirits," within any vat or tank, in such manner as to cause injury to or endanger the life or health of the person so using it, or any other person or persons.

Any person who violates any of the provisions in Section 1 of this act shall be punished by a fine of not less than \$25 nor more than \$100 for each such offense.

It shall be the duty of the Commissioner of Labor, the Factory Inspector, or any assistant factory inspector to enforce this act.

(*Offenses Against Lives and Persons*, Section 4398g, Chap. 274, 1905, p. 1327.)

Wisconsin Deems a Drug to be Adulterated if it Contains Wood Alcohol, Except When Intended for External Use and is so Labelled.

A drug shall be deemed to be adulterated if it contains *wood alcohol*, except when intended for external use only and so labelled.

(Section 4601, *Drugs*, *Third Suppl.*, 1906, to *Statutes of 1898*, amended by Chapter 202, *Laws of 1909*.)

(3) MUNICIPAL ORDINANCES.

New York, N. Y.

New York City Prohibits the Use of Wood Alcohol in any Preparation for Internal or External Human Consumption.

No person or corporation shall have, sell or offer for sale any food or drink which contains *methyl alcohol* (commonly known as *wood alcohol*) or any preparation or mixture of any kind whatsoever containing the same, intended either for internal or external use by man; nor shall *methyl* or *wood alcohol* or any preparation or mixture containing the same be used upon or applied to the person or body of another.

(Section 66a, *Sanitary Code of the City of New York*, adopted January 23, 1912.)

San Francisco, Cal.

San Francisco Prohibits the Use of Methyl Alcohol in Drugs for Internal Use of Man.

It shall be unlawful to sell, offer for sale, deliver or cause to be delivered any drug or medicine labelled with the recommendation that the same is for the internal or external use of man which contains *methyl alcohol*.

(Ordinance 76, Section 4, *Sanitary Code of the Department of Public Health of the City and County of San Francisco, Cal.*, 1911, p. 69, adopted October 10, 1906.)

2. LEGISLATION IN CERTAIN FOREIGN COUNTRIES.

The Dominion of Canada.

Canada Prohibits the Use of Methyl Alcohol in Beverages, Pharmaceutical and Medicinal Preparations Intended for Internal Use. It is Supplied by the Government for Manufacturing Purposes.

Chapter 51, Section 251.—When wood naphtha, wood alcohol, or methylated or other denatured spirit is to be used for manufacturing purposes in Canada, it shall be supplied by the department on such conditions as are determined by the department regulations in that behalf, and the price thereof shall not exceed the actual cost with the addition of fifteen per centum.

(*Revised Statutes of Canada, 1906, 2, p. 968.*)

Section 265.—Every person who deodorizes or clarifies, or attempts to deodorize or clarify, any methylated spirits, whether by distillation, filtration, or any other process, is guilty of an indictable offense, and shall for the first offense be liable to a penalty of \$500, and for each subsequent offense to a penalty of \$1,000.

Section 266.—Every person who uses spirits containing methyl alcohol in any form in any pharmaceutical or medicinal preparation intended for internal use, shall be liable to a penalty of \$500.

Chapter 167, Section 17.—Alcoholic, fermented or other potable liquors sold, or offered or exposed for sale, shall be deemed to have been adulterated in a manner injurious to health if they are found to contain methyl alcohol and its derivatives, etc., etc.

Penalties therefor . . .

(*Revised Statutes of Canada, 1886, 2, p. 1448.*)

England.

England Prohibits the Manufacture and Sale of Methyl Alcohol, Methylated Spirits, or Derivative Thereof to be Used as a Beverage or Internally as a Medicine. (Exception is Made in Case of Sulphuric Ether and Chloroform).

Chapter 24, Section 130, Spirit Act, 1880.—(1) If any person . . .

a) prepares or attempts to prepare any methylated spirits (214) [or methylic alcohol] for use as or for a beverage, or as a mixture with a beverage; or

b) sells any methylated spirits [or methylic alcohol], whether so prepared or not, as or for a beverage, or mixed with a beverage; or

c) uses any methylated spirits (215) [or methylic alcohol], or any derivative thereof in the preparation of any article capable of being used wholly or partially as a beverage, or internally as a medicine; or

d) sells or has in his possession any such article in the preparation of which methylated spirits (216) [or methylic alcohol], or any derivative thereof has been used, he shall for each offense incur a fine of 100 pounds, and the spirits with respect to which the offense is committed shall be forfeited.

(2) Nothing in this section shall apply to the use of methylated spirits (217) [or methylic alcohol] in the preparation of sulphuric ether or chloroform, for use as a medicine, or in any art or manufacture, or prevent the sale or possession of any sulphuric ether or chloroform for such use.

(*Statutes of England*, 14, 43-4 Vict., Chapter 24.)

Chapter 20, Section 2. Revenue Act, 1906.—(5.) Section 130 of the Spirit Act, 1880, shall apply as if it were an offense under that section without the consent in writing of the commissioner or otherwise than in accordance with regulations to purify or attempt to purify methylated spirits or methylic alcohol, or, after methylated spirit or methylic alcohol have been used once, to recover the spirit or alcohol by distillation or condensation, or in any other manner.

(6) This does not apply to sulphuric ether and chloroform. (*Edw. VII*, 6, Chapter 20.)

France.

France Allows Duty-Free Denatured Alcohol in the Arts and Industries.

France allows the sale of tax-free denatured alcohol for:

1. Lighting, heating, and making "finish;"

(214, 215, 216, 217) Words in brackets inserted by 61-68 Vict. C., 46, S. 14.

2. For manufacturing purposes, *viz.*, varnishes, solid extracts, solidified spirits, plastic substances, alkaloids, fulminate of mercury, transparent soap, insecticides.

[The alcohol is denatured with ten liters of wood spirit, 90° (580 p.), containing twenty-five per cent. acetone and twenty-five per cent. "impurities pyrogenes," for 100 liters of spirit.]

Germany.

Germany Allows Duty-Free Denatured Alcohol in the Arts and Industries.

Germany allows the sale of duty-free spirit which is made undrinkable by:

1. Twenty per cent. wood naphtha and 0.5 per cent. of pyridine bases;
2. Five liters of wood spirit per 100 liters of spirit. Freedom from duty includes —
 - a) Release from the "consumption" tax and its additions;
 - b) The refunding of the "fermenting-vat" tax at the rate of 0.16 mark per liter of pure alcohol;
 - c) Return of distilling tax at rate of 0.06 mark per liter of pure alcohol.

The employment of methyl alcohol in wines, whiskies, pharmaceutical and cosmetical preparations is prohibited, according to von Buchka (*Chem-Ztg.*, 1912, 36, No. 134, 1309.)

Prussia.

Prussia Prohibits the Free Sale of Methyl Alcohol.

The free sale of methyl alcohol was prohibited in Prussia in May, 1911.

(Laws of Prussia, Forster, *Münch. med. Wochschr.*, 1912, 248.)

Austria-Hungary.

Austria-Hungary Allows the Use of Duty-Free Denatured Alcohol in the Arts and Industries.

The sale of duty-free denatured alcohol is allowed to be used in hat-making, varnishes, fulminate of mercury, vinegar, etc.

The spirit is denatured with two per cent. of wood naphtha and 0.5 per cent of pyridine bases.

Hungary.

Hungary Prohibits the Free Sale of Methyl Alcohol.

The free sale of methyl alcohol is forbidden in Hungary.

(Laws of Hungary, Forster, *Münch. med. Wochschr.*, 1912, 248.)

Russia.

Russia Allows the Sale of Duty-Free Spirit.

The sale of duty-free spirit is permitted. The Minister of Finance issues permission to persons wishing to use denatured alcohol, limited to one year.

Japan.

Japan Prohibits Manufacture and Sale of Comestibles and Beverages Containing Methyl Alcohol. All Containers of Wood Alcohol Must Be Clearly Labelled. Sales Must Be Entered in Trade Book.

According to the *Chemical World* (1, No. 10, 359), in consequence of the recent cases of poisoning by wood alcohol on the European Continent, which led to strict measures for the regulation of the trade in several countries, the Japanese government issued (1912) new regulations. According to these, the manufacture and sale of comestibles and beverages containing wood alcohol are absolutely prohibited. The sale of any article containing such alcohol is illegal, unless a label on the container clearly indicates the character of the contents. Manufacturers, dealers and importers who handle wood alcohol in any form are required to keep a trade book, and to make entries concerning the amounts manufactured, received, transferred, or sold, to whom sold, object of purchase, and adding date of sale.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS.

Prohibition of Use of Wood Alcohol in Foods, Beverages or Medicines to be Taken Internally.

The data and facts summarized in this report warrant the following conclusions:—

1. (a)—While there may be differences in opinion as to the actual toxicity of absolutely pure methyl alcohol, the preponderating evidence indicates that its physiological action spells injury. The toxicity of the ordinary methyl alcohol of commerce, commonly called wood alcohol, even though it be of a higher grade of purity, is a recognized fact, whether its morbid action be due to the concomitant impurities or not.

The use of methyl or wood alcohol in any food, condiment, flavoring extract, or liquid capable of being used in whole or partially as a beverage, or internally as a medicine, should therefore be prohibited by law. This is covered in part at present by Article 8, Agricultural Law No. 201, State of New York, cited on p. 982.

Injustice Liable in Present Law Through Lack of Control.

(b)—In connection with the law just referred to, I would like to direct your attention to a lack in clarity, and, in consequence, likely injustice from attempts at its execution. The intent of the law is undoubtedly wholesome, but the use of the word "methylated" is ambiguous. In the loose English sense, it means ethyl alcohol which has been denatured with methyl alcohol; but it has an even wider meaning from what might appear as its real intent. One instance will illustrate the point. Methyl salicylate, oil of wintergreen, is a recognized product of manufacture used for flavoring, which is a "methylated" preparation. It is the same as oil of wintergreen made from natural sources. If the synthetic preparation were properly labelled, it would not be a case of misbranding, morally, within the meaning of the section (No. 201, *loc. cit.*), yet a court could very properly hold

that it was, because synthetic oil of wintergreen is a "methylated preparation." The wood alcohol is no longer present as such and the physiological action of the wood alcohol is no longer observed. The above is true of many synthetic perfumes, flavoring extracts (as vanillin), and drugs of recognized medicinal value which are welcomed as legitimate commercial products of the chemist's art.

Prohibition of Use of Wood Alcohol in Fluids to be Applied Externally on the Human Body.

2. As the skin is a membrane through which many liquids readily pass, the application of wood alcohol to the skin serves as a means of introducing it into the circulation. The absorption is instantaneous if there are abrasions. Furthermore, when a liquid containing wood alcohol is applied as a liniment or wash, the air becomes more or less saturated with its vapor. When this vapor is breathed, the wood alcohol exerts its characteristic physiological action. Wood alcohol should, therefore, not be permitted in those preparations such as perfumes, witch hazel, bay rum, "eau de cologne," liniments, washes, etc., which are intended primarily for external use on the human body. It may be remarked that "tippling" with these preparations is not uncommon.

Use of Denatured Alcohol in Liniments, Etc., Meant for External Use Alone.

The question of allowing ethyl alcohol which has been denatured with methyl alcohol to be used for this purpose, namely, in liniments, etc., might appear as one open to argument primarily on the basis of dilution. The denaturing formulas now in effect by Federal consent do not encourage but discourage the use of industrial alcohol for such purposes. In my opinion, it would be better to err on the safe side and to make the restriction only as the occasion arises.

Ample Ventilation in Works Where Wood Alcohol is Made and Refined.

3. In the manufacture of wood alcohol the workmen are liable to come into contact with the vapor only in neutralizing the acetic

liquor with lime and in filling the shipping containers. In case of the former, the common practice now is to carry out the operation in closed vats, which are opened only when lime is dumped in. General requirements for *ample ventilation* should meet these difficulties, which, in fact, do not now exist in the works inspected in New York State.

Laws on Use of Wood Alcohol in the Arts.

4. Wood alcohol is a valuable solvent, used as such extensively in the arts in two important ways.

(a)—It is used as a solvent in the *course of the manufacture* of many substances, but does not appear in the product when the latter is put upon the market. It is not destroyed, but evaporates or is saved in part by condensation. It can exert its deleterious action during the process

- (1) by the workmen breathing its fumes.
- (2) by the workmen constantly dipping their hands and arms into the liquor, or
- (3) by the workmen drinking the wood alcohol.

Ample ventilation will meet the first difficulty. Standards should be determined in each case by the Board of Health or such board with authority, as may be designated.

In the second case, the workmen should be provided with impervious long gloves or the processes should be operated mechanically; and if a closed process be used, the first difficulty is also largely met.

Education only can solve the third problem.

(b)—Wood alcohol serves as a solvent or menstruum of the material which is placed on the market in a liquid form (varnishes), and exerts its action upon the users, depending upon multiform conditions. In works where these materials are used in large quantities and the solvent evaporates, *ample ventilation* should be required. In many cases, however, the workmen are more or less isolated. They may and should be warned of the danger attendant by suitable labels on the vessels containing the liquid they are to apply.

Proper Labels.

5. All bottles or vessels used for transporting or selling products containing wood alcohol should be required to bear a prominent display label stating that it contains a "Poison," and giving advice as to the danger of working with the material without ample ventilation.

RECOMMENDATIONS AS TO LAWS.

My study of the subject warrants recommending the existence of laws as follows:—

Internal Use.

1. A law prohibiting the presence of wood alcohol in any form of material intended for internal use;

External Use.

2. A law prohibiting the presence of wood alcohol in preparations intended for external use on the human body;

Ample Ventilation Where Made or Used.

3. A law requiring *ample ventilation* in works where wood alcohol is made or used in manufacturing products wherein the wood alcohol remains as such; the same law should apply where the products containing wood alcohol are used up, as, for example, in varnishing vats in breweries;

Proper Labels.

4. A law requiring containers in which wood alcohol is marketed to bear suitable display labels of warning; and

Clarifying Present Restrictions.

5. These laws should be so drawn as not to inhibit the use of wood alcohol in manufacturing products in which methyl alcohol supplies a constituent part, but does not remain as wood alcohol therein.

Respectfully submitted,

CHAS. BASKERVILLE,

*Professor of Chemistry and Director
of the Laboratory of the College
of the City of New York.*

APPENDIX A.

AFFIDAVITS OF EMPLOYEES AS TO INJURY FROM WOOD ALCOHOL, USED AS A SOLVENT FOR SHELLAC IN HAT STIFFENING.

Hearing before Ways and Means Committee, 59th Congress—1st Session, Feb.-March, 1906.

| NAME—AGE. | Place. | Period of Employment with wood alcohol. | Incapacity to work due to wood alcohol. | Result. |
|-----------------------|-----------------|---|--|---|
| H. H. O'Brien, 55... | Boston..... | 10 years | 6 years..... | Asthma. |
| T. Peters, 64..... | Boston..... | 10 years | 100 days annually. | Pain in eyes; scarcely able to see. |
| B. Perry, 32..... | Danbury, Ct.... | 5½ years | 60 days annually. | Ill effects to entire system. |
| Geo. Sherwood, 38... | Danbury, Ct.... | 2½ years | 1½ days, 250 parts of days annually. | Eyes and stomach affected. |
| J. W. Grimshaw, 46 | Danbury, Ct.... | 32 years | 50-60 parts of days annually. | Almost blind; cannot see to read and write. |
| H. Imagersuppe, 32. | Danbury, Ct.... | 12 years | 50 days and 1 year parts of days annually. | Eyes and lungs affected. |
| G. Gustafson, 18.... | Danbury, Ct.... | ½ year | 100 parts of days annually. | Normal. |
| A. Williams, 20..... | Danbury, Ct.... | 4 years | 30 days annually. | Inflammation of eyes and nostrils; cannot see bright light; loss of appetite. |
| I. N. H. Harrison, 27 | Danbury, Ct.... | 13 years | 300 days annually. | Eyesight affected. |
| C. Wilkins, 31..... | Danbury, Ct.... | 13½ years | 15 days and 170 parts of days annually. | Eyes painful; dry throat, bad cough. |
| Wm. Phillips, 47.... | Danbury, Ct.... | 20 years | 30 days and 20 parts of days annually. | Eyesight and health impaired; dry throat and cough. |
| Wm. Williams, 42... | Danbury, Ct.... | 15 years | ½ time each week. | Unable to read or sit in bright light. |
| I. Wood, 18..... | Danbury, Ct.... | 1 year | 8 days annually. | Bad effect upon eyes and stomach. |
| Wm. Clark, 25..... | Danbury, Ct.... | 10 years | 200 days annually. | Eyes, stomach and nose affected. |
| Nelson, 31..... | Danbury, Ct.... | 12 years | 20 parts of days. | Inflammation of eyes and catarrhal headache. |
| Eyre, 39..... | Danbury, Ct.... | 13 years | 25 days; parts of days annually. | Eyes affected; unable to read for days. |
| Patrick, 61..... | Danbury, Ct.... | 20 years | ..... | Eyes very weak and inflamed; nausea. |
| Logan, 36..... | Danbury, Ct.... | 8 years | 60 days annually. | Eyes and stomach affected. |
| Geo. Birt, 26..... | Danbury, Ct.... | 9 years | 20 days annually. | Loss of appetite; inflammation of eyes. |
| Halas, 20..... | Danbury, Ct.... | 1 year | 10 days annually. | Inflammation of eyes and intense pain. |
| G. Williams, 45.... | Danbury, Ct.... | 4 years | ½ time off each week. | Unable to read or sit in bright light. |
| W. Smith, 76..... | Danbury, Ct.... | 3 years | ½ day at time | Dry throat, and nose trouble. |
| F. Elwell, 37..... | Danbury, Ct.... | 10 years | —days annually. | |
| F. Leahy, 19..... | Danbury, Ct.... | 3 years | 24 days annually. | Sick and sometimes a rash. |
| Booth, 60..... | Danbury, Ct.... | 15 years | 30 parts of days annually. | Eyes strained; unable to read nights; cannot stand ordinary light. |
| Muchfeld, 34..... | Danbury, Ct.... | 16 years | 36 days annually. | Eye trouble. |
| F. Patrick, 41..... | Danbury, Ct.... | 11 years | ..... | Eyes weak and generally impaired health. |

APPENDIX A.—Continued.

| NAME—AGE. | Place. | Period of employment with wood alcohol. | Incapacity to work due to wood alcohol. | Result. |
|----------------------------------|-----------------|---|---|---|
| J. Trowbridge, 44... | Danbury, Ct.... | 12 years | Great many parts. | Inflammation of eyes and nose. |
| Brown, 34..... | Danbury, Ct.... | 13 years | 10 days annually. | Inflammation of eyes and catarrh. |
| R. Melser, 30..... | Danbury, Ct.... | 10 years | 2 days annually. | Inflammation of eyes; was forced to discontinue work 3 months. |
| S. J. Stickey, 41.... | Danbury, Ct.... | 18 years | 5 days and 3 parts of a day. | Effect on eyes and stomach; affects liver and kidneys; cannot read nights. |
| F. Jackson, 34..... | Danbury, Ct.... | 6 years | 40 days annually. | Temporary blindness; general sickness and disability; weak eyes; dry throat and nose. |
| A. Stevens, 68..... | Danbury, Ct.... | 1 year | 2 days annually. | Affected eyes, nose, throat and stomach; dry cough. |
| E. R. Fay, 28..... | Danbury, Ct.... | 10 years | 10-15 days; 15 parts of day. | Dull sickening headache; cannot read after work. |
| Ch. W. Lee, 35..... | Danbury, Ct.... | 5 years | 15 days; 12-15 parts of days. | Eyes, nose, throat and chest trouble. |
| J. A. Burke, 24.... | Danbury, Ct.... | 12 years | 12-20 parts of days. | Poor eyesight, throat trouble, kidney trouble and sugar diabetes, swelling legs and feet. |
| Chas. Sherwood, 34. | Danbury, Ct.... | 10 years | 300 parts of days annually. | Normal. |
| B. S. Brooks, 49.... | Danbury, Ct.... | 18 years | 3 years..... | Eyes affected. |
| A. Jane, 17..... | Danbury, Ct.... | $\frac{1}{2}$ year | 12 days; 100 parts of days | Normal. |
| H. B. Stevens, 20... | Danbury, Ct.... | 2 years | 14 days annually | Eyes and nose affected. |
| Wm. Griffin, 20.... | Danbury, Ct.... | 1 year | 5 days and 10 parts of days. | Had to give up job. |
| G. Mongin, 50..... | Danbury, Ct.... | 15 years | 10 days annually | Sore eyes, weak stomach. |
| F. V. Green, 40.... | Danbury, Ct.... | 3 years | ..... | Whole body poisoned with alcohol; cannot do any kind of work. |
| G. B. Keelar, 69.... | Danbury, Ct.... | 15 years | 25 days; 40 parts of days | Eyes very sensitive; cannot read by artificial light. |
| A. Collins, 18..... | Danbury, Ct.... | 4 years | 50 days; 100 parts of days | Eyesight affected; cannot read by gas light. |
| R. Abbott, 29..... | Danbury, Ct.... | 3 years | 20 days annually. | Weak eyes; nose affected, and a blind sty. |
| Ben Cooper, 60.... | Danbury, Ct.... | 10 years | 50 days; 30-40 parts of days. | Eyes sensitive; cannot stand sunlight or read by gas light. |
| J. Neal, 48..... | Danbury, Ct.... | 1 year | 30 days; 30 parts of days | Eyes sensitive; cannot read by gas light. |
| Ch. H. Wood, 34.... | Danbury, Ct.... | 10 years | 5 days annually. | Inflamed eyes, nose affected; must stop work frequently. |
| M. Quinn, 36..... | Danbury, Ct.... | 12 years | 20 days annually. | Temporary blindness, intense pain, general health bad; impossible to read at night; uses an eye wash. |
| A. von Wil, 37..... | Danbury, Ct.... | 12 years | 25 days annually. | Eyesight and lungs affected. |
| T. Tucci, 18 $\frac{1}{2}$ | Danbury, Ct.... | $\frac{1}{2}$ year | 12 parts of day. | Inflammation of eyes, with intense pain. |
| J. Madden, 30..... | Danbury, Ct.... | 7 years | 30 days annually. | Headache and poor sight. |

APPENDIX A.—Concluded.

| NAME—AGE. | Place. | Period of employment with wood alcohol. | Incapacity to work due to wood alcohol. | Result. |
|-----------------------|------------------|---|---|--|
| J. P. Berry, 36..... | Danbury, Ct.... | 4 years | ..... | Intense pain and inflammation of eyes; was obliged to give up work. |
| J. Porrotaki, 35..... | Danbury, Ct.... | 6 years | 12 days; 20-30 parts of days | Unable to read after work; headaches, general effects of cold. |
| F. E. Wilcox, 48.... | N. Y. State..... | 12 years | 3 months.... | Weak eyes, vision of left eye impaired; gave up this branch. |
| J. J. McDonald, 33.. | Kings Co..... | 7 years | ..... | Itchy rash on back of hands; occasional headache. |
| I. Osborne, 37..... | Kings Co..... | 10 years | ..... | Inflamed eyes, occasional headache. |
| M. E. Connor, 23... | Kings Co..... | 3 years | ..... | Inflamed eyes and weak, hands itch. |
| J. V. Schenck, 35... | Kings Co..... | 10 years | 2 weeks one time | Arms, hands and eyes occasionally irritated. |
| F. B. Webb, 38..... | Kings Co..... | 10 years | 6 days annually | Eyes affected. |
| J. Wilde, 56..... | Kings Co..... | 18 years | ..... | Eyes affected. |
| E. J. Wood, 29..... | Kings Co..... | 13 years | ..... | Eyes affected. |
| Wm. H. Stone, 65... | Bethel, Ct..... | 13 years | 2-3 days a week | Inflammation of eyes in gas light. |
| W. J. Stone, 43..... | Danbury, Ct.... | 3 years | 3-5 parts of days annually. | Eyes, head and whole nervous system affected; gave up work. |
| S. S. Reed, 49..... | Danbury, Ct.... | 6 years | 10-20 parts of days annually. | Eyesight and nervous system affected. |
| J. W. Booth | Newark, N. J.... | 15 years | 2-5 hours at a time. | Nervous exhaustion and gastritis; confined to house since Jan. 15, 1906. |
| W. Pilcher, 44..... | Newark, N. J.... | 5 years | 3-4 hours per day able to work. | Eyes smart and tear; cannot stand any light. |
| F. E. Andrews, 44... | S. Norwalk, Ct.. | 14 years | 40 days; 30 parts of days | Eyes smart and tear; cannot stand any light. |
| J. W. Coleman, 45... | New Milford, Ct. | 15 years | 20 days annually. | Improved health after sickness due to the alcohol. |
| F. Beach, 18..... | New Milford, Ct. | 2 years | 30 days annually. | Weak eyes, poor eyesight, loss of hair. |
| M. J. McMahon, 31.. | New Milford, Ct. | 12 years | 20 days annually. | Weak eyes, poor sight. |
| G. Plumb, 28..... | New Milford, Ct. | 5 years | 20 days annually. | Weak eyes, poor sight. |
| H. S. Booth, 45..... | New Milford, Ct. | 10 years | 20 days annually. | Weak eyes, poor sight. |

APPENDIX B.

FREE ALCOHOL.

Hearing Before Ways and Means Committee, Fifty-ninth Congress, First Session, February-March, 1906.

Physicians' statements of injuries from using wood alcohol —
C. A. Stratton, M. D., and D. C. Brown, M. D.

Class A.—Cases who have been forced to discontinue work in the stiffening department of hat factories on account of the effects of wood alcohol.*

Case 1. Benjamin Perry, Danbury, Conn.; age, 32. Worked in wood alcohol 5½ years; began to have trouble at the end of three months, with inflammation of the eyes and nausea. After leaving work was unable to stay in light and had to remain in dark room for an hour or two.

Vision: Right eye, 15/30; left eye, 15/20.

Examination of deeper structures — negative; lungs, normal; liver, normal; kidneys, normal.

Case 2. George Sherwood, 54 Pleasant Street, Danbury, Conn.; age, 38. Worked at stiffening about 8 years ago; in wood alcohol 2½ years. Gave up on account of inflammation of eyes; could not work an entire day because his sight failed him. Trouble with eyes began with tears running down the cheeks and then the nostrils. Some days could work until late in the afternoon, but at other times not more than two hours, when vision failed. Eyesight usually returned within an hour or two after leaving work. While working in the factory was unable to read at all during the evenings; when not working in wood alcohol, had no difficulty about reading in artificial light.

Vision: Left eye, 15/30; right eye, 15/20; conjunctiva, normal; lids slightly thickened; right eye has scotoma or blind spot;

*In these cases, apparently no consideration was given to optic disturbances produced by the use of tobacco. Ophthalmological investigations show that tobaccoism deserves to be considered along with alcoholism.

right disc is cupped at outer side; left eye, normal. Nose, normal; throat, normal; lungs, normal; heart, normal; liver, $3\frac{1}{2}$ inches; functions, normal; kidneys, normal.

Case 3. James Grimshaw, Danbury, Conn.; age, 46. Worked in wood alcohol 32 years, and gave up about October, 1906, on account of failing eyesight. While working in wood alcohol, his eyes were badly inflamed, but eyesight remained fair up to 6 years ago, when it began to fail.

Vision: Is able to distinguish large objects, but is unable to recognize features at a distance of a few feet; vision for reading, totally lost; is able to recognize test card letters 1 1/40 with each eye; conjunctiva, normal; lids, not thickened; both optic discs are deeply cupped. Nose, normal; throat, normal; lungs, normal; heart, normal; liver, normal; kidneys, normal.

Case 4. Henry Magersuppe, Danbury, Conn.; age, 32. Worked 12 years in stiffening room with wood alcohol; had to give up four years ago on account of inflammation of eyes. Suffered also from inflammation of nasal passage and cough. During last year had to use wash for eyes.

Vision: Right eye, 15/70; left eye, 15/50. Right eye optic disc congested, veins enlarged and tortuous; left eye, same condition. Is unable to read with but best illumination. Vision has improved since stopping work, but, at that, unable to read at all nights.

Nose, septum deflected toward left; membrane congested; mucous membrane extends abnormally near the rim of nostril. While working with wood alcohol had severe inflammation of nasal mucous membrane. Throat: there is a chronic pharyngitis; rima glottis and epiglottis intensely congested; vocal chords clear; there is no hoarseness. Lungs, normal; heart, normal; liver, normal; kidneys, normal.

Case 5. John P. Berry, 96 Garfield avenue, Danbury, Conn.; age, 36; weight, 200 pounds. Worked in wood alcohol 4 years; began to fall off in work, and discontinued work in 1898, on account of pain in the eyes and dimness of vision. While working in wood alcohol, his eyes would smart and burn so that he could not keep them open; was unable to use eyes in the evening

after working there the day, especially in winter. The eyes usually began to pain him at 9 o'clock and trouble continued for the rest of the day. Drinks beer occasionally, but did not use liquor while working in wood alcohol.

Vision: Right eye, 15/20; left eye, 15/30; conjunctiva not inflamed; lids not swollen or thickened; physiological blind spot only; optic discs not clearly defined; pink edges not clear; blood vessels not normal; eyes easily fatigued and congest quickly. Nose, normal; throat, normal; kidneys, normal; liver, normal; lungs, normal.

Case 6. L. F. Ising, Danbury, Conn.; age, 44; jeweler. Nine years ago worked with blowpipe and alcohol lamp in which he burned wood alcohol an hour or two each day for three weeks. A short time after his eyes began to trouble him with an intense conjunctivitis and ulceration of both cornea, followed by failing vision; has had conjunctivitis ever since, and was forced to give up watchmaking.

Conjunctiva intensely congested in both eyes; lids very much swollen and glued together in the morning. Vision: Right eye, 10/40; left eye, 10/50. Both optic discs are choked, borders scarcely to be made out; veins tortuous, discs quite pink, blind spots normal in position in both eyes, the left increased to double that of right. General physical condition, normal.

Case 7. Gustav Gustavson, Germantown, Danbury, Conn.; age, 18. Worked in wood alcohol six months; had to give up on account of its effect on the eyes; could not stand the burning and could not see nights after finishing work. There was pain in eyes, and excessive flow of tears and discharge from nose. Eyes congested; lids thickened.

Vision: Right eye, 15/20; left eye, 15/20. Neither optic disc has any cupping; nerves show congestion and enlargement of veins. Sensation of tightness in throat, slightly congested. Does not use alcoholic drinks.

Class B.—Working in stiffening department of hat factories and show effects of wood alcohol.

Case 1. Charles Clark, 77 South Street. Danbury, Conn.; age, 28. Worked in stiffening room 14 years. Had been so affected

that he was unable to open his eyes for three days at a time. Is unable to use eyes any evening after working. Conjunctiva strongly congested and lids are much thickened. There is excessive secretion from eyes; both optic discs are strongly congested; vision is dim; is unable to use test type. Nose: nasal membrane congested, has to breathe through mouth; pharynx and upper larynx strongly congested and swollen. Lungs: there are coarse bronchial rales over entire chest.

Case 2. Anson Williams, Rocky Glen, Danbury, Conn.; age, 20. Worked with wood alcohol four years. Began to have trouble with eyes; discharges from nose and cough. Is unable to read at night after work; intolerance to light; conjunctiva congested; lids swollen and congested; optic discs not clear; swelling of both discs brought forward $1\frac{1}{2}$ D. Inferior turbinated bones of nose swollen and meet at septum; unable to breathe through nose at night; larynx and pharynx congested; vocal chords congested and voice husky; no appetite after working; has pain in epigastrium; lost five pounds in two months.

Case 3. William Slade, 10 North Street, Danbury, Conn.; age, 49. Worked in wood alcohol two years. Has to stop several times during the day for one-quarter or one-half hour to recover from the effects of the alcohol on his eyes, so that he can see to continue work. Has to lie down in a dark room for an hour after arriving home. Eyes are always glued together in the morning after working, with sticky discharges. Suffers from dizziness while at work. Has been unable to read for past month. Eyes become red and fiery, with tears constantly running, while at work. Both lids swollen, not acutely congested; left eye, optic nerve pink, cupped on outer side. Right nerve is cupped three-quarter out and one-quarter in. Vision: Right eye, $12/50$; left eye, $12/50$; blind spot in left eye normal, but three times normal size; right eye, normal. General physical condition, normal.

Case 4. John N. Harrison, 25 Town Hill, Danbury, Conn.; age, 27. Worked in stiffening department 13 years. Began to have trouble with eyes on first beginning to work with wood alcohol; dimness of vision, inflammation of eyes; is able to work by using cocain. Lids slightly thickened; optic disc shows excessive

cupping, with dilation of veins; blind spot in position, but three times normal size in each eye. Pharynx and larynx congested, catarrhal condition; otherwise normal.

Case 5. C. Wilkins, 62 Davis Street, Danbury, Conn.; age, 31. Worked 13½ years in wood alcohol; had to use cocain for past ten years to relieve pain and to allow him to continue work. Suffers from catarrh in nose and throat, and a feeling of distension in head. Lids thickened, and swollen optic discs deeply cupped; veins dilated and tortuous; blind spot extends over entire right upper quadrant in right eye. Left eye, normal. Membranes of nose intensely congested, especially on septum. Lungs: coarse bronchial rales over entire chest. Skin of hands worn so that the lower layers crack and bleed easily. Otherwise physically normal.

Case 6. William J. Phillips, Middle River, Danbury, Conn.; age, 47. Worked in stiffening room 16 years until last winter, when he was obliged to use cocain in order to continue work, and finally gave up that branch of hatting entirely. Can not see to read at night. Had irritation of nose and dry cough. Right optic nerve cupped; vision diminished in both eyes. Physical condition, normal.

Case 7. William R. Williams, Danbury, Conn.; age, 42. Worked 15 years in stiffening room. Began to have trouble with eyes at start; they became irritated and inflamed, and was unable to see in bright light or read at night. There is a chronic discharge from nose and dry cough. Conjunctiva inflamed. Vision: left eye, 15/70; right eye, 15/40; optic nerve cupped; veins distended and tortuous in both eyes. Nose: membrane congested and swollen; excessive secretion of mucous. Throat congested; voice clear. Lungs: had moist bronchial rales on both sides; otherwise normal.

Case 8. Harold Wood, 8 Crofut Street, Danbury, Conn.; age, 18. Worked with wood alcohol for one year. Began to have trouble with nose and eyes first week; began to cough after three weeks; had to stop work eight days one time, and many times during day to recover from effect of alcohol upon the eyes. After

work is unable to see, read, and has blur before eyes constantly. Conjunctiva intensely congested and lids swollen. Fundus intensely congested; veins dilated and tortuous; intolerance to light. Nose: right nostril intensely congested. Lungs: moist bronchial rales on both sides of chest; otherwise normal.

SUMMARY.

Of 60 men in the department of stiffening hats examined, all of them were suffering as stated in their affidavits. None of the men ever used stimulants to excess, many have used them in moderation; they state no man can work in wood alcohol and drink at the same time. Physicians were able to recognize the individuals who worked with wood alcohol from their breath. Stratton and Brown believe that the effects of wood alcohol are constitutional.

APPENDIX C.

I. SUMMARY OF CASES OF POISONING BY DRINKING WOOD ALCOHOL AND PREPARATIONS THEREOF.

1. *Ages of Individuals.*

The ages range from 21 years to 56 years; the largest number are of middle life, although a few cases of children from 8 to 17 years of age and of old persons (65 years of age) are reported.

2. *Sex of Individuals.*

Most of the victims are males, from 5 to 7 per cent. are females, and in a large number of cases the sex is not stated.

3. *Habits of Life.*

In more than half of the cases the habits of life are not stated; of those reported, the majority of the victims were moderate drinkers; from 25 to 30 are stated to have been hard drinkers, a few used tobacco to excess, and some are reported to have been total abstainers.

4. *Occupations.*

The victims were of various stations of life; thus, 7 were convicts; about 25 were Indians, who, being unable to obtain good whiskey, went on a spree with Jamaica ginger, lemon extract, etc.; about 20 were negro and white laborers, 17 boatmen, 15 sailors, 14 soldiers, 7 painters; farmers, bricklayers, millworkers, shoemakers, physicians, ranchmen, mechanics, miners, hotel-keepers, blacksmiths, carpenters, housewives, etc., etc. In a large number of cases the occupation is not stated.

5. *Mode of Occurrence.*

By far the largest number of poisoning cases are due to drinking whiskeys, rum, etc., adulterated with wood alcohol; at least 200 such cases are reported. The ingestion of wood alcohol during prolonged drinking bouts and sprees is next in importance; about 40 authentic cases of such a nature are reported. A large number of poisoning cases are also reported of people who drank wood alcohol ignorant of its toxic action. One remarkable case

of methyl alcohol drinking with suicidal intent in San Francisco is reported by Powers.

6. *Form of the Wood Alcohol Partaken.*

About 250 cases of poisoning are reported as due to drinking "deodorized" wood alcohol, 20 from drinking "Columbian spirits," 25 from Jamaica ginger, 6 from ginger essence, 12 from methylated bay rum, 17 from lemon extract, about 70 from Kunzens balsam, 2 from Florida water, 2 from liniments, 1 from essence of cinnamon, 1 from eau de Cologne, 2 from bitters, 1 from "Cologne spirits," 1 from "Union spirits," and 1 from sherry wine. The amounts ingested are from one-half an ounce in some cases to a quart in others.

7. *Symptoms.*

(a) Very serious cases:

Become ill 24-36 hours after partaking. Cyanose, blueness of hands, feet, legs and face, feeling of nausea, vomiting, prostration, deep forced breathing, longing for air, restlessness, groaning, convulsions, twitchings, clonic and tonic convulsions of limbs, pain in head, limbs and body and especially in epigastrium. Pulse not frequent, and good at first, then small and soft. The conditions of eyes most characteristic; pupils dilated and reactionless, accommodation weak but not altogether paralyzed, visual disturbance and blindness. Death comes suddenly after the paralysis of the respiratory organs; breath ceases, while heart beats for some time.

(b) Not so serious:

Same symptoms; patients who are not in a serious condition suddenly become serious. Condition of pupils and dyspnoea always present. On appearance of respiratory disturbances, cases become serious.

(c) Cases of light poisoning:

Visual disturbance, dilative inactive pupils; no disturbances of breathing. Patients do not show alcoholic intoxication; there is no odor of alcohol. Visual disturbances are general, also amnesia. Diarrhoea seldom occurs; usually patients are constipated.

Opisthotonos was observed in serious cases, head back and held rigid on neck; reflexes were maintained, especially optic nerve reflexes, which were very active.

Conditions of excitation and attack of mania 24-36 hours after beginning of poisoning. In vomit, blood is sometimes found, but never in evacuation. Patients complain of dryness in mouth and throat, thirst, inability to breathe, oppression of chest, pain in side, and feeling of constriction.

Urine contains albuminous matter, which disappears on improvement; stomach contains a slimy substance, sometimes made darker by blood present in it.

Temperature of body, normal. Patients feel an antipathy for alcohol.

The illness is changing; sometimes one symptom becomes stronger, sometimes another; death is sudden, following paralysis of respiratory centers and collapse. First symptoms are forced breathing and physical want of air. Light cases may become serious; reactions may set in at any time; after improving, a patient may again become serious.

8. *General Effects and Results.*

The fatality is very great: out of 720 cases, 390 died, 90 became totally blind; in 85 cases, the vision was impaired, 6-10 became blind temporarily, 31 recovered; and, in about 100 cases, the results are not specifically stated. Thus the mortality is about 55 per cent., total blindness 12 per cent., impairment of vision 12 per cent., and recovery about 4 per cent.

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|-------------------------------------|--|------|------|--|---|--|
| 1 | Taylor (1875). | "Poisons" | M | .... | .... | Drank methyl alcohol. | Died. |
| 2 | Viger & Menjin (1879). | Rec. Ophth. J., 636; L'annee med., 1877. | M | .... | Convict; drank small amounts of ethyl alcohol 3 months previously. | Washed out a varnish barrel with 2 L. water and drank $\frac{1}{4}$ liter of liquid (methyl alcohol). | Intense headache, vomiting, profuse sweating, dilation of pupils and delirium. Completely blind next day; sight improved, then turned blind again. Two years later: optic discs snowy white. |
| 3 | Dr. H. C. Kipp (1888). | Balt. M. J., 19, 448. | M | 28 | Painter; on a spree occasionally. | Taken a considerable quantity of wood alcohol. | Pupils widely dilated, eyes protruding, respiration slow and labored, pulse weak, unconscious, cyanotic. Died a few hours later. |
| 4 | Dr. A. G. Thompson (1897) | Proc. Phila. M. Soc., 1897, 172. | M | 32 | Sailor. | Drank 20 ounces Jamaica ginger in 2 days. | Headache, nausea, and vomiting next day. Became completely blind; vision improved, then turned blind again. 3 $\frac{1}{2}$ months later: R. V. = counting fingers at 1 meter; L. V. = 1-100, eccentric. |
| 5 | Drs. MacCoy & Mitchell (May, 1898). | Med. Rec., 53. | M | 21 | Attendant; habits good | Drank 4 oz. "Columbian Spirits," repeated dose in 2 hours. | Violent emesis, gastric pain, pupils wide and fixed. Vision = 0; vision improved after 14 days, but 12 months later was totally blind, with atrophy of optic nerves. |
| 6 | Dr. H. Woods (Feb., 1899). | Ophth. Rec. | M | 32 | Bricklayer. | Drank Jamaica ginger. | Pain in stomach; vision became dim, then improved, and now again failed; vision eccentric, optic nerve atrophied, contracted fields, absolute central scotoma. |
| 7 | Dr. H. Woods, Balt., Md. (1899). | Ophth. Rec. | M | 38 | Milworker; often drank to excess. | Drank Jamaica ginger. | Vomiting, diarrhoea, gastro-intestinal cramps. Headache; became unconscious and awakened totally blind. V = fingers at 20 feet for right and 10 feet for left; contracted fields, central scotoma. |
| 8 | Dr. H. Woods (Feb., 1899). | Ophth. Rec. | M | 47 | Stock herder. Heavy smoker; often drank to excess. | Ginger essence, etc., 1 $\frac{1}{2}$ to 2 pints. | Nausea, vomiting, pain in head, sudden blindness; vision improved to counting fingers at 6 inches; fields limited to small area on temporal side; small central scotoma. |

| No. | Reports and data. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|---|---------------------------|------|------|--|---|--|
| 9 | Dr. H. Woods (Feb., 1899). | Ophth. Rec. | M | 56 | Shoemaker; occasionally went on spree. | Ginger essence, etc., 1½ to 2 pints. | 48 hours after giddiness, headache, gastro-intestinal pains, dimness of vision, then total blindness. Five months later optic nerves atrophied. Vision = 0. |
| 10 | Dr. H. Woods (Feb., 1899). | Ophth. Rec., 8, 5. | M | 32 | Physician; habitual inebriate. | Ginger essence, etc., 1½ to 2 pints. | Headache, vomiting, abdominal pain; became and remained totally blind. |
| 11 | Dr. R. S. Patillo (1899). | Ophth. Rec., 8, 599. | M | 52 | Mechanic; periodic drinker and heavy smoker. | Ginger essence, etc., 1½ to 2 pints. | Nausea, headache, abdominal pain; became blind and is still totally blind. |
| 12 | H. Gifford. | Ophth. Rec. | M | 45 | Not stated. | ½ pint of ½ wood alcohol and ½ water. | Vomiting, headache; became totally blind; pupils wide and fixed. Vision improved, then turned totally blind with atrophy of optic nerves, which is his condition at present. |
| 13 | H. Gifford (Sept., 1899). | Ophth. Rec. | M | 33 | Miner. | Drank pint "Columbian spirits." | Wildly excited; pulse and respiration rapid; became totally blind; died 24 hours later. |
| 14 | Dr. Kuhnt (1899). | Z. Augenhk., 1, 42. | M | 24 | Workman. | Several ounces of methyl alcohol and whiskey. | Nausea, giddiness; fell into deep sleep; became totally blind; vision returned and is normal at present. |
| 15 | Dr. J. F. Raub (Nov. 18, 1899). | Ophth. Rec., 8, 619. | M | .... | .... | ½ ounce of methyl alcohol. | Became and remained totally blind. |
| 16 | Dr. J. F. Raub (Nov. 18, 1899). | Ophth. Rec., 8, 619. | M | .... | Sailor. | Methyl alcohol and benzine. | Became and remained totally blind |
| 17 | Dr. J. F. Raub (Nov. 18, 1899). | Ophth. Rec. | M | .... | Sailor. | Methyl alcohol and benzine. | Died. |
| 18 | Dr. H. Moulton, Ft. Smith, Ark. (July, 1899). | Ophth. Rec., 8, 335. | M | 33 | Painter. | ½ pint of wood alcohol. | Became totally blind, but vision improved to: Vision, R = Pl., L fingers at one foot; complete atrophy of nerves. |
| 19 | Callan (1899). | Arch. Ophth., 1899, 129 | M | .... | .... | Drank wood alcohol. | Died. |
| 20 | Callan (1899). | Arch. Ophth., 1899, 129 | M | .... | .... | Drank wood alcohol. | Became and remained totally blind. |
| 21 | Moulton (1899). | Ophth. Rec., 8, 335. | M | .... | .... | Drank a large quantity of wood alcohol. | Died. |
| 22 | Gifford (1899). | Ophth. Rec., 8, 441. | F | .... | .... | Drank wood alcohol. | Died. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|--------------------------|--|-------|-------|-------------------------------------|--|---|
| 23 | Payne (1902)..... | Ophth. Rec., 10, 662.
G. Bl. A. 1902, 176 | M | | | Drank large quantity of methyl alcohol. | Became totally blind; optic discs milkwhite; blood vessels of cornea contracted; pupils widely dilated. |
| 24 | Gifford (1899)..... | Ophth. Rec.,..... | M | .... | ..... | Drank methyl alcohol.. | Died. |
| 25 | Kuhnt (1899)..... | Z. Augenhk., 1, 38..... | M | .... | Workman in wood distillation plant. | Drank wood alcohol.... | Gastro-enteritis set in. |
| 26 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 27 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 28 | | Baltimore Ev. News,
Dec. 13, 1901. | | | | | |
| 29 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 30 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 31 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 32 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 33 | Moulton (1900)..... | Proc. Med. Soc. Ark.,
1900, 285. | M | 33 | Painter..... | Drank Jamaica ginger.. | All seven died. |
| 34 | Stieren (1901)..... | J. Am. Med. Assn..... | M | Adt. | ..... | Drank 8 oz. of wood alcohol. | Became totally blind; vision improved. Five months later, pupils dilated and inactive. I. V. = fingers at 1 ft. R. V. = pl. Complete atrophy of optic nerves. Total blindness in three hours; recovery to normal since. |
| 35 | Harlon (Feb., 1901)..... | Ophth. Rec., 10, 81.... | M | 30 | ..... | Drank Jamaica ginger.. | Vision impaired, 5-200 in each eye; improved since to central V. = 6-200. |
| 36 | Jackson (Apr., 1901).... | Medical Times, Denver. | M | 30 | | Three bottles of essence of peppermint and part of bottle of essence of lemon.
Drank wood alcohol.... | Unconsciousness 48 hours; became blind; improved since to fingers at 3 feet; field much contracted; optic discs white, vessels small. Unconscious three days; became and remained totally blind. |
| 37 | Harlon (Feb., 1901)..... | Ophth. Rec.,..... | M | 28 | ..... | 14 bottles Jamaica ginger in one day. | Became totally blind. |
| 38 | Moulton..... | Centr. Augenhk., 1901,
406. | M | | | Drank bay rum containing wood alcohol. | 8 died. 5 became totally blind, 1 nearly blind, 1 blind temporarily, and 4 recovered without any disturbance of vision. |
| 39 | H. T. Guss (1901)..... | Med. World, 19, 501.... | ..... | ..... | ..... | 19 cases of serious poisoning by wood alcohol. | Became totally blind. |
| to | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 53 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 59 | Stieren..... | J. Am. Med. Assn., 1900 | M | .... | ..... | Drank Jamaica ginger.. | Became totally blind. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|---------------------------|---|------|-------|-----------------------------|--|---|
| 60 | Gifford (1901)..... | M. Herald, St. Joseph, 90, 1325. | M | 35 | ..... | 8 ounces of wood alcohol. | Became totally blind; vision improved to almost normal. |
| 61 | De Bono (1901)..... | Arch. d'Ottalm., Palermo, 1901-02, 9, 130, 142. | M | 43 | Hotel keeper..... | 15 ounces of a "preparation." | Became and remained totally blind. |
| 62 | Burnett (1901)..... | Therapeutie ejaz..... | M | 65 | ..... | 1 ounce of wood spirit. | Vision impaired permanently. |
| 63 | Burnett (1901)..... | Therapeutie ejaz..... | M | 64 | ..... | Jamaica ginger..... | Permanent blindness. |
| 64 | Burnett (1901)..... | Therapeutie ejaz..... | M | 32 | ..... | 2-4 ounces of pure wood alcohol. | Total permanent blindness. |
| 65 | Burnett (Mar., 1902)..... | Wash. Med. Ann., 1, 76, 1902, 150. | M | ..... | ..... | 6 ounces of Jamaica ginger. | Vision permanently impaired. V = 5-15 rt. 5-35 l.; central scotoma of 10°; total color blindness. |
| 66 | Payne (1902)..... | Ophth. Rec., 10, 662. | M | ..... | ..... | Drank wood alcohol..... | Died. |
| 67 | Von Fleet (1902)..... | Med. Rec., N. Y., 61, 91. | F | ..... | ..... | Drank wood alcohol thinking it to be ordinary alcohol. | Became totally blind, but vision has improved since to R. E. = 20-200; L. E. = 3-200. |
| 68 | McConachie..... | Am. Med., 3, 96. | M | 34 | Sailor..... | Drank Jamaica ginger. | Became totally blind. |
| 69 | Burnett (June, 1902)..... | Ophth. Rec..... | M | ..... | ..... | 3 ounces of Jamaica ginger..... | Within 48 hours foggy vision; improvement as to R. V.: 165°-10-8.05-15; T. V.: 180°-1.0-7.05-35. |
| 70 | Ring (July, 1902)..... | Trans. Am. Ophth. Soc., 1902. | F | ..... | Washerwoman..... | 4 ounces of wood alcohol. | Dizziness, nausea, vomiting, dim vision; became totally blind. |
| 71 | Ring (July, 1902)..... | Trans. Am. Ophth. Soc., 1902. | F | 43 | Housewife..... | 5 ounces of wood alcohol. | Vision returned to normal since. |
| 72 | Ring (July, 1902)..... | Trans. Am. Ophth. Soc., 1902. | F | ..... | Housewife..... | 3 ounces of wood alcohol. | Vomiting, coma; sighing, respiration, followed by death. |
| 73 | Ring (July, 1902)..... | Trans. Am. Ophth. Soc., 1902. | M | ..... | Workman..... | 5 ounces of wood alcohol. | Died. |
| 74 | Ring (July, 1902)..... | Trans. Am. Ophth. Soc., 1902. | M | ..... | Workman..... | 4½ ounces of wood alcohol. | Remained totally blind. |
| 75 | Bell (July, 1902)..... | Trans. N. H. Med. Soc. | M | ..... | Prisoner..... | Drank wood alcohol. | Vision impaired to 5-200 for right eye, 10-200 for left eye, with restricted fields, but no central scotoma. |
| 76 | Bell (1902)..... | Trans. N. H. Med. Soc. | M | ..... | Carpenter..... | Considerable quantity of wood alcohol. | Vision impaired; partial recovery. Epigastric pain, vomiting, great prostration, pupils dilated, vision dim; became capricious, lapsed into coma, and died. |

| No. | Reports and data. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|-------------------|-----------------------------------|------|-------|--------------------------------------|---|--|
| 77 | Bell (1902)..... | Trans. N. H. Med. Soc.. | M | ..... | Woodsmen..... | Unknown quantity of wood alcohol. | Died. |
| 78 | Bell (1902)..... | Trans. N. H. Med. Soc.. | M | ..... | ..... | Wood alcohol, quantity not stated. | Nausea, vomiting, headache, feebleness, pain on movement of eyes, vision dim, pupils dilated and sluggish. Recovered except a permanent defect of vision. |
| 79 | Bell (1902)..... | Trans. N. H. Med. Soc.. | M | ..... | Convict, Maine State prison. | Unknown quantity of "Columbian spirits." | Died. |
| 80 | Sherer..... | Phila. M. J., 2, 792..... | M | 32 | Farmer..... | As above..... | Nausea, vomiting, vertigo, headache, sweats, stiffness of limbs, vision impaired, R. V. 1-60 eccentric fixation, absolute central scotoma, field contracted: L. F. Pl. only, optic nerves atrophied. |
| 81 | Sherer..... | Phila. M. J., 2, 792..... | M | ..... | Farmer..... | As in case 80..... | Dizzy, nauseated, vomited, headache, vision dim, completely recovered. |
| 82 | Hoitt..... | Bost. M. S. J., 1903, 62..... | M | 48 | <i>Under-wood Family.</i>
Father. | Drank wood alcohol.... | Died. Wood alcohol found in stomach. |
| 83 | Hoitt..... | Bost. M. S. J., 1903, 62..... | F | 8 | Daughter..... | Drank wood alcohol.... | Died. Wood alcohol found in stomach. |
| 84 | Hoitt..... | Bost. M. S. J., 1903, 62..... | F | 22 | Daughter..... | Drank wood alcohol.... | Died. Wood alcohol found in stomach. |
| 85 | Hoitt..... | Bost. M. S. J., 1903, 62..... | M | ..... | Grandson..... | Drank wood alcohol.... | Died. Wood alcohol found in stomach. |
| 86 | Hoitt..... | Bost. M. S. J., 1903, 62..... | F | 44 | Wife..... | Drank wood alcohol.... | Died. |
| 87 | Abbot (1903)..... | Bost. M. S. J., 1903, 63..... | M | ..... | ..... | Drank "Colonial spirits," declared to be wood alcohol by a chemist. | Died. |
| 88 | Abbot..... | Bost. M. S. J., 1903, 63..... | M | ..... | ..... | Drank "Colonial spirits," declared to be wood alcohol. | Died. |
| 89 | Abbot..... | Bost. M. S. J., 1903, 63..... | M | ..... | ..... | Drank "Colonial spirits," and other name for wood alcohol. | Died. |
| 90 | Wilder..... | Biochem. Zentr., 4, 2203 No. 561. | M | 33 | Drunkard..... | Drank methyl alcohol once. | Became totally blind. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|---------------------------|---|-------|-------|-----------------------------|---|---|
| 91 | Hartshon (May, 1903)... | Charlotte, N. C., M. J. . . | M | 36 | | Drank lemon extract... | Vomiting, vertigo, headache, tenderness of eyeballs. Vision impaired but improved since almost to normal.
Died after becoming blind. |
| 92 | Main (Sept., 1903)..... | Am. Med., No. 10..... | M | 44 | Watchmaker..... | Lemon extract containing methyl alcohol. | Became blind then died. |
| 93 | Armstrong (Oct., 1903)... | Maritime M. News, Halifax, N. S. | M | 33 | Upholsterer and varnisher. | Bay rum, 1 pint and 7 ounces methylated spirits. | |
| 94 | Armstrong (Oct., 1903)... | Maritime M. News, Halifax, N. S. | M | 35 | Laborer..... | 7 ounces of methylated spirit. | Became blind then died. |
| 95 | Buller (Jan., 1904)..... | Montreal Med. J..... | F | 34 | Dressmaker, temperate. | $\frac{1}{2}$ ounce methyl alcohol. | Became totally blind, vision improved since to fingers at 3 ft. in each eye. V. fields narrowed, absolute scotoma, optic nerves atrophied. |
| 96 | Buller (Jan., 1904)..... | Montreal Med. J..... | M | 39 | Barber, temperate.... | $\frac{1}{2}$ ounce methyl alcohol. | Became blind, improved since to R. V. = fingers at 8 ft. L. V. fingers at 3 ft; nerves atrophied. |
| 97 | Conboy (1904)..... | J. Mich. M. Soc., §, 536 | ..... | ..... | ..... | Drank wood alcohol.... | Amblyopia set in. |
| 98 | Conboy..... | J. Mich. M. Soc., §, 536 | ..... | ..... | ..... | Drank wood alcohol. . . | Amblyopia set in. |
| 99 | Strohmberg..... | Petersb. Med. Wochenschr., 1904, No. 39. | ..... | ..... | ..... | Reports of 18 cases of poisoning in Durpot, Russia from Kunzen balsam containing 50% wood spirit. | 15 died and 2 became blind. |
| 118 | Buller (Jan., 1904)..... | Montreal Med. J..... | M | 42 | Carpenter, temperate... | 6 ounces of "Columbian spirits." | Headache, dimness of vision, total blindness, improved since to R. V. = 6-22; L. V. = 6-27. |
| 119 | Brunner (Feb., 1904).... | Ophth. Rec., Biochem. Zentr., §, 122, No. 320 | M | 47 | ..... | Wood alcohol, quantity not stated. | Prostration and vomiting several days, vis on blurred, then totally blind. Improved at end of 6 $\frac{1}{2}$ months to R. V. 1-45; L. V. 2-40. Nerves highly atrophic, vessels small, V field reduced. |
| 120 | Foucher (Mar., 1904).... | L'Union Medicale du Canada. | M | 22 | Laborer..... | 1 pint of wood alcohol. | Became and remained totally blind. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|-----------------------|-------------------------------------|------|------|-----------------------------|---|--|
| 121 | Wilder (May, 1904) | Ophth. Rec. | M | 33 | China decorator. | 1 pint of wood alcohol. | Right eye totally blind permanently; L. E. fingers at 1 ft. in temporal field; pupils both dilated. |
| 122 | Gifford. | Ophth. Rec., 1901. 443. | M | .... | ..... | Drank Eau de Cologne. | Became totally blind, no improvement in vision since. |
| 123 | Cheatham (1904). | Louisville Month. J. M. S., 12, 27. | M | 45 | Hard drinker. | Drank sherry wine adulterated with wood alcohol. | Became totally blind. |
| 124 | Cheatham. | Louisville Month. J. M. S., 12, 27. | M | .... | Music teacher. | Drank wood alcohol. | Became totally blind. |
| 125 | Cheatham. | Louisville Month. J. M. S., 12, 27. | M | .... | ..... | Drank essence of cinamon made up with wood alcohol. | Became totally blind. |
| 126 | Stirling. | Ophth. Rev. London, 24, 38. | M | 41 | ..... | Drank 6 ounces wood spirit. | Vision impaired; R. E. = 1-20; L. E. = 1-10. Total color blindness, optic discs chalk white, retinal vessels contracted. |

CASES COLLECTED BY BULLER AND WOOD, J. AM. MED. ASSN., 43, 972, 1058, 1117, 1213, 1289 (1904), NOS. 127 TO 301, INCLUSIVE.

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|---|--|------|----------|---------------------------------|---|--|
| 127 | Dr. Stillson, Seattle, Wash. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | J. F. (tramp) | Drank a large quantity of Union Spirits (wood alcohol). | Died. |
| 128 | Dr. Brunson, Chicago... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 40 | B. M. (negro woman) .. | Drank $\frac{1}{2}$ pint of Columbian spirits. | Died. |
| 129 | Dr. Fagan, North Adams, Mass. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 29 | Mrs. X. | Drank Jamaica ginger and Columbian spirits. | Died. |
| 130 | Dr. Collins, Duluth, Minn. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Indians, Minnesota Reservation. | Drank freely of essence of peppermint. | All suffered from severe gastrointestinal symptoms and three died from the effects; one of them became blind before death. |
| 131 | Dr. W. G. Craig, Hartford, Conn. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 45 | J. P. (Polish) | Drank a mixture of sugar, water and Columbian spirits. | This was followed by nausea, vomiting, repeated convulsions, coma and death in 24 hours. |
| 132 | Dr. Springer, Coroner's Physician, Cook Co., Ill. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 25 to 40 | Laborers (negro) | Drank an unknown quantity of wood spirits. | Four died from the effects of the poison. One recovered. |
| 133 | Dr. G. G. Davis, Philadelphia, Pa. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Lumberman | Drank wood spirits used in painting. | Was wildly delirious and died in a few hours. |
| 134 | Dr. J. F. Dickson, Portland, Me. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 30 | Teamster | Drank wood alcohol mixed with syrup. | Became unconscious and died. |
| 135 | Dr. J. A. Dingman, Spring Valley, N. Y. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 47 | A. McK. (servant) | Drank wood alcohol.... | Died. |
| 136 | Dr. J. A. Donovan, Butte, Mont. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Indians | Drank wood alcohol.... | All three died. |
| 137 | Dr. W. E. Driver, Norfolk, Va. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 29 | R. N. and 6 companions | Drank freely of essence of lemon. | All seven died from the results of the poison. |
| 138 | Dr. Elwood, Menominee, Mich. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | C. H. (cook) | Went on a spree with 12 bottles of lemon extract. | Died. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-------------|--|--|------|----------|---|---|--|
| 152 | Dr. Enfield, Jefferson, Iowa. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | An adult..... | Drank pint of wood alcohol. | Died. |
| 153 | Dr. Engle, Newton, Ia... | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | F | 20 | Mrs. N..... | Drank few ounces of diluted Columbian spirits. | Died in 20 hours. |
| 154 | Dr. Engle, Newton, Ia... | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 30 | A. Baker..... | Drank wood alcohol... | Baker died; McLeish was in a critical condition. |
| 155 | Dr. W. H. Wood, Sulphur, Ind. Ter. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 30 to 40 | 4 men..... | Went on a spree with bay rum made of wood alcohol. | One died. |
| 156 and 157 | Dr. A. Greene, Anniston, Ala. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | McK. and C..... | Drank wood alcohol thinking it to be grain alcohol. | Both died. |
| 158 and 159 | Dr. A. Greenwood, Boston, Mass. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | 2 painters..... | Drank wood alcohol... | Both died. |
| 160 | Dr. G. E. Hartshorn, S. McAllister, Ind. T. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | G. G. (barber)..... | Drank pint of bay rum | Died in 12 hours. |
| 161 | Dr. Hartshorn..... | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 16 | Ed. W..... | Drank pint wood spirit thinking it to be grain alcohol. | Died in 6 hours. |
| 162 and 163 | Dr. R. Hunt and Dr. Stansfield, Pub. H. & Marine Hospital. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | 4 Italian woodchoppers. | Went on a spree with wood alcohol. | 3 died. |
| 164 and 165 | Dr. R. Hunt, Pub. Health & Marine Hospital. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 48 | A. P. Baer (soldier); J. Washburn (cook). | Both drank wood alcohol. | Both died. |
| 166 and 167 | Dr. R. Hunt..... | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | E. E. (woodsman)..... | Drank 6 ounces methy-lated spirit. | Died. |
| 168 | Dr. J. H. Jamor, Elkton, Ind. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | F | ... | Woman tramp..... | Drank "hot drops" containing 95% wood alcohol. | Died. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and result. |
|-------------|---|--|------|------|--|--|--------------------------------|
| 169 and 170 | Dr. G. T. Knowles, Magnom, Ill. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 35 | Farmer..... | Drank lemon extract each. | All three died. |
| 171 and 172 | Dr. J. J. Main, Barry, Ill. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 65 | Blacksmith.
Farmer. | | |
| 173 | Dr. J. J. McKinney, Barry, Ill. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 40 | Man..... | Drank Jamaica ginger.. | Died. |
| 174 | Dr. Miles, Bridgeport, Conn. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 25 | G. K. (Painter)..... | Drank methylated alcohol. | Died. |
| 175 and 176 | Dr. Miles, Bridgeport, Conn. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 45 | S. Knowles (soldier).... | Drank wood alcohol.... | Died one hour later. |
| 177 | J. E. Minney, Topeka, Kan. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | 9 Poles..... | Drank 2 gallons of wood alcohol. | 2 died; the other 7 recovered. |
| 178 | Newspaper Rep., Downers Grove, Ill. (Feb. 1, 1903). | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | P. O. (engineer)..... | Drank wood alcohol.... | Died. |
| 179 and 180 | Newspaper Rep., Rockland, Mass. (Apr., 1903). | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | | Frank Helms.....
T. Helms.
Wm. Conn. | Drank wood alcohol.... | All three died. |
| 181 | Newspaper Rep., Philadelphia. (Oct., 1903). | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | .... | Mrs. F. Progin..... | Drank wood alcohol.... | Died. |
| 182 | Dr. Patton, Stillwell, Ind. Ter. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 65 | L. G. (carpenter)..... | Drank lemon extract.... | Died. |
| 183 | Dr. G. H. Powers, San Francisco, Cal. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 26 | A. C. G..... | Took a single dose of wood alcohol with suicidal intent. | Died. |
| 184 | Dr. E. H. Robb, Newton, Iowa. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 60 | G. C. (barber)..... | Drank ½ ounce of bay rum made up with wood alcohol. | Died in 36 hours. |
| 185 | Drs. Short and Shaw, Hot Springs, Ark. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | W. T..... | Drank wood alcohol.... | Died. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-------------|---------------------------------------|--|------|------|------------------------------|---|--|
| 186 | Dr. Short and Shaw, Hot Springs, Ark. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Companion of above. J. A. | Drank wood alcohol.... | Died. A third party to the spree vomited, had cramps in stomach, became unconscious but finally recovered. |
| 187 | Dr. C. Storz, Toledo, Ohio. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 42 | W. (painter)..... | Drank a few ounces of wood alcohol. | Died in 2½ hours. |
| 188 | Dr. Salmon, Okla. City, Okla. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 36 | R. (Ind. Ter.)..... | Drank bitters containing wood spirits. | Died. |
| 189 | Dr. C. Storz, Toledo, O. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 40 | I. B..... | Drank wood alcohol.... | Complained of pain in the abdomen, became unconscious and died. |
| 190 and 191 | Dr. J. W. Scales, Pine Bluff, Ark. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 45 | J..... | Drank three bottles of Jamaica ginger and of bay rum each. | Died with all the symptoms of methyl alcohol poisoning. |
| 192 | Surgeon Genl. of Army.. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 36 | J. W. R. (Private U. S. A.). | Drank Florida water and Columbian spirits. | Died. |
| 193 | Surgeon Genl. of Army.. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 23 | T. O'B. (corporal)..... | Drank Columbian spirits. | Died. |
| 194 | Surgeon Genl. of Army.. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 36 | M. O'C. (soldier)..... | Drank Columbian spirits. | Died. |
| 195 | Surgeon Genl. of Army.. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | A. (private U. S. A.)... | Drank wood alcohol.... | Died from acute poisoning with methyl alcohol. |
| 196 | Surgeon Genl. of Army.. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | B. (private U. S. A.)... | Drank wood alcohol.... | Died. |
| 197 | Surgeon Genl. of Army.. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | C. (private U. S. A.)... | Drank a punch made from bay rum, witch hazel, vanilla extract, etc. | Died. |
| 198 | Surgeon Genl. of Army.. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | A. (soldier)..... | Drank bay rum made with wood alcohol. | Died. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|------------|--|--|------|------|---|--|---|
| 199 to 207 | Dr. J. P. Widmeyer, Roller, N. D. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Indians from Mountain Reservation. | Drank Florida water and lemon extract mostly wood alcohol. | Nine of the Indians died, one survived but became totally blind. |
| 208 | Dr. G. H. Woodward, N. Y. C. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Man..... | Drank essence of lemon and witch hazel. | Died. |
| 209 | Drs. Bach & Schneider, Milwaukee, Wis. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 46 | D. McK. of Ashland, Wis. No previous history of blindness was not a habitual drinker. | Drank Hinkley's bone liniment. | Within 4 days he became totally blind in left eye and partially blind in right eye; 6 months later his vision was 3-40, there was no perception of light. |
| 210 | Beaupre, Quebec, Can... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 42 | Went on spree every month. | Drank $\frac{1}{2}$ tumblerful of methyl alcohol. | Within a few hours was nearly blind, vision in either eye was finger counting at 9 inches; two weeks vision of R. eye = 15-40; vision of L. eye = 15-200. |
| 211 | Bell, Vicksburg, Miss... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 50 | M. B. (white) blacksmith. | Drank Jamaica ginger occasionally for 3-4 months. | Became blind suddenly, sight returned for a short time and then he became totally blind again. |
| 212 | Bicknel, Omaha, Neb. . . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 35 | G. W. A. (ranchman in good health. | Drank a considerable amount of wood alcohol. | Became and remained totally blind. |
| 213 | Boris, Seattle, Wash. . . . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 27 | German, cabinetmaker. | Drank 2 ounces of wood alcohol. | An hour after was in deep stupor, stertorous breathing, body cold, bloody froth from mouth, pupils dilated. Vision and gait affected for several days. |
| 214 | Brundage & Ingala, Brooklyn, N. Y. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 35 | Mrs. M. Habitually addicted to excessive alcoholic drinks. | Drank $\frac{1}{2}$ pint of wood alcohol | Became unconscious, sweated, nauseated, vomited, was delirious, pupils dilated, vision became blurred. Died 36 hours after drinking the wood alcohol. |
| 215 | Bruno, New Orleans, La. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 50 | ..... | Drank one ounce of wood alcohol (Colombian spirits). | Became blind, sight returned for a short time, but became blind again and remained so. |
| 216 | Bruno, loc. cit..... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | ..... | Drank a highball made up partly of wood alcohol. | Became and remained totally blind. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|------------|----------------------------|--|------|------|--|--|---|
| 217 | Bulston, Jackson, Mich.. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 48 | John C. (convict)..... | Drank wood alcohol, 10 ounces one day and 4 on next day. | Vomited, walk unsteady, pupils were dilated and became blind. Seven months later his vision was finger counting 3-4 inches in each eye. |
| 218 | Collins, Duluth, Minn. . . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 46 | Used tobacco, went on spree several times yearly, avoided liquor between sprees. | Drank together with companion 12 bottles of Jamaica ginger. | Vomited, vision began to fail at once. A month later his vision was 2-200 in either eye. Bilateral post neuritic optic atrophy. |
| 219 | Buller, Montreal, Can. . . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 28 | Coder, Well built, healthy, no previous history of any disease. | Drank a wine glass of methylated Jamaica ginger. | Had headache, 12-14 hours after eight began to grow dim. Took a second dose and became worse. Three months later central vision in both eyes was completely lost. |
| 220 to 222 | Collins, Duluth, Min. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Indians..... | 3 Indians drank lemon extract, containing wood alcohol. | All three died. |
| 223 | Collins, Duluth, Min. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Indians..... | 3 Indians drank lemon extract, containing wood alcohol. | Became totally blind, atrophy of both optic nerves. |
| 224 | Craig, Hartford, Conn. . . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 50 | ..... | Drank 3 ounces of a mixture of water-sugar and Columbian spirits. | Nausea, vomiting and complete loss of vision in 12 hours. A month later vision was 1-8 in each eye, nerve heads chalk white. |
| 225 | Cullom, Nashville, Tenn. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Workman, N. Y. | Drank wood alcohol.... | Went into a stupor and became totally blind, pupils widely dilated and no response to light, nerve heads milk white. Died. |
| 226 | Dickson, Portland, Ore. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 30 | Teamster, strong, healthy. | Drank a mixture of wood alcohol, water and syrup. | Became totally blind and has remained so. |
| 227 | Dickson, Portland, Ore. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 30 | Teamster, strong, healthy. | Drank less than his companion, only a few mouthfuls. | |
| 228 | Edwards, Columbia Tenn. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Lawyer (young)..... | Drank a mixture of bay rum and alcohol. The bay rum contained Columbian spirits. | Pain in stomach, nausea, then became totally blind. Diagnosis toxic amblyopia. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|--|--|------|------|--|---|--|
| 229 | Driver, Norfolk, Va. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 25 | J. B. (U. S. sailor)..... | Drank wood alcohol.... | Became totally blind; diagnosis wood alcohol amblyopia, 43. |
| 230 | Driver, Norfolk, Va. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | U. S. sailors | Drank wood alcohol.... | Died. |
| 231 | Driver, Norfolk, Va. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 25 | A. H. S. (white)..... | Drank cider from a country store. (The cider contained wood alcohol). | Became blind, vision returned to left eye to 6-200 and he remained blind in right eye. |
| 232 | Driver, Norfolk, Va. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 39 | R. W. (pedlar)..... | Drank 4 ounces wood alcohol diluted with water. | Became blind; 7 months later vision returned to 1-200 in each eye. |
| 233 | Dudley, Easton, Pa. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 45 | J. F. | Drank ½ pint of Columbian spirits diluted with water. | Died. |
| 234 | Eagle, Newton, Ia. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | ..... | Went on a spree with methylated bay rum. | Two who drank large quantities died |
| 235 | Ford, Sulphur, Ind. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | ..... | ..... | Companions of the above drank small quantities, had visual disturbances for 12-14 days. After 2 weeks vision returned. |
| 236 | Ford, Sulphur, Ind. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | ..... | ..... | Became blind, then died. |
| 237 | Goldsmith, Sprague & North, Hart. Rep. (June, 15, 1904). | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Wm. Sutherland..... | Drank wine glass of methyl alcohol. | Died. |
| 238 | Gordon & Buller, Montreal, Can. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 40 | B. K. Domestic Alcoholic had been drinking two days. | Drank 8 ounces of wood alcohol. | Died. |
| 239 | Grawn & Scholtes, Munising, Mich. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 37 | J. B. (woodman)..... | Drank 2 quarts of wood alcohol with companion. (See below.) | Died 14 hours after. |
| 240 | Grawn & Scholtes, Munising, Mich. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 40 | L. B. (woodman)..... | Drank 2 quarts of wood alcohol with companion. (See below.) | Died 17 hours after. |
| 241 | Grawn & Scholtes, Munising, Mich. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Storekeeper..... | Drank Jamaica ginger.. | Became totally blind. |

| No. | Ports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-------------|---------------------------------------|--|------|------|-----------------------------|--|--|
| 244 | Harlan, Barringer, Thurman. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 38 | W. H. J. (merchant)... | Drank Gilbert's Jamaica ginger containing 70 per cent wood alcohol, 4½ ounces wood alcohol in 3 doses during 3 days. | Became totally blind, vision improved in 10 days. He has marked optic nerve atrophy. Vision became dim. in both eyes. V. R. = 5-30 no jerker; V. L. = perception of light. 3 months later right pupil torpid, arteries small, discs pale; V = 20-50 and Sn 3, field slightly contracted. Left eye same condition; slightly exaggerated disc, decidedly atrophic V fingers at 6 ft.; Sn 20 at 12 inches. Same condition 6 months after. Vision disturbed R. E. 10-60; L. E. 10-40 which remained permanent. |
| 245 | Hubbel & Howe, Buffalo, N. Y. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | ... | Dr. B. W. S. N. Y. S. | | |
| 246 | Dr. Hughes, Salt Lake City, Utah..... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 40 | J. A. (stonemason)..... | Drank freely of wood alcohol. | |
| 247 and 248 | E. E. Jack, Boston, Mass. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 71 | J. P. | Drank wood alcohol.... | Both had a long period of insensibility and both were blind on regaining their senses; a neuritis followed by rapid atrophy. |
| 249 | E. Jackson, Denver, Colo. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | ... | ..... | Drank a large quantity of wood alcohol. | Suffered from severe gastro-intestinal irritation, vomiting and impairment of vision, vision improved until on 18th day, V = 4-60, R. and L. |
| 250 | Dr. Jamar, Elkton, Ind.. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 37 | A tramp..... | Drank wood alcohol.... | His eyesight was greatly affected for the first day or so, but improved in a few days. |
| 251 | Lamb, Owoso, Mich.... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 25 | J. F. | Considerable quantity of Columbian spirits. | Marked contraction of field in both eyes and vision was permanently reduced 20-100; 20-80 R. and L. of 2 friends who drank with him one died and the other suffered amaurosis. |
| 252 | Lamb, Owoso, Mich..... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 30 | J. B. | Columbian spirits..... | Lost eyesight R. E. V. = 20-200, L. E. V. = 10-200 with narrowing fields. Condition at present but slightly improved. Optic atrophy. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results |
|------------|-----------------------------|--|------|------|-----------------------------------|--|--|
| 253 to 255 | Lamb, Owosso, Mich..... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | 3 Swedes..... | Deodorized wood alcohol. | Central vision greatly reduced, visual fields much contracted, optic atrophy. |
| 256 | Lewis, Dubuque, Iowa... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 38 | J. C. (drunkard)..... | Wood alcohol..... | Became blind and died soon after. |
| 257 | Lewis, Dubuque, Iowa... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 49 | ... F..... | Wood alcohol $\frac{1}{4}$ cup 4 ounces. | Became blind and remained so. |
| 258 | Lippincott, Pittsburg Pa. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 47 | F. C. (laborer)..... | A large quantity of wood alcohol. | Became blind and still has no light perception. |
| 259 | Lippincott, Pittsburg Pa. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 31 | J. R. (oilwell driller)... | Drank 24 ounces Jamaica ginger. | Became blind and remained blind ever since. |
| 260 | Magee, Topeka, Kans... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 33 | Mrs. S. P..... | Medicine glass of wood alcohol diluted with water. | Vision impaired, R. E. = 16-100 L. E. = 4-200. |
| 261 | McKinney, Barry, Ill... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | James Ripple (jeweler, drunkard). | Extract of lemon almost composed entirely of wood alcohol. | Became blind and died two days after ward. |
| 262 | Minney, Topeka, Kans... | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 129 (1914). | M | .... | Pole, farmhand..... | A large quantity of wood alcohol. | Became totally blind and has remained so ever since. |
| 263 | Moore, Huntington, W. Va. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 36 | G. S. (baker)..... | Wood alcohol..... | Became blind, present vision R. E. = fingers at 12 inches; L. E. = with lenses 20-40. |
| 264 | Moore, Huntington, W. Va. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 45 | House painter..... | $\frac{1}{2}$ pint methylated spirits. | Became totally blind, one year later he was still totally blind, both discs were white. |
| 265 | Moulton, Ft. Smith, Ark. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 52 | S. W. McK. | 4 bottles of essence of lemon. | Became totally blind, his vision improved until when last seen, R. E. = 10-100; L. E. = finger counting at 3 feet. |
| 266 | Murray, Cedar Rapids, Iowa. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Male cook in lumber camp | Drank a liniment for 'extremities' and internal use about 72 ounces. | Vision impaired, pupils widely dilated, skin cool and moist. Vision improved since. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|---|--|------|------|--|---|---|
| 267 | Oliver, Phila., Pa. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 30 | Skilled laborers. | Wood alcohol. | One had his central vision reduced 1-8 of normal, 1 by 1-15 both by reason of large positive scotomata. Became unconscious, then delirious and died. |
| 268 | Dr. Oren, Lewiston, Ill. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 35 | Frank H. (laborer, habitual drunkard). | Drank freely of lemon essence. | |
| 270 | Dr. Patterson, Grand Rapids, Mich. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 43 | Mr. H. (habitual drinker). | Drank wood alcohol by mistake. | Became and remained totally blind. |
| 271 | Patton & Williams, Stillwell, Ind. Ter. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 17 | P. F. | 6-7 bottles of lemon extract. | Became totally blind and died a little after. |
| 272 | Patton & Williams, Stillwell, Ind. Ter. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 24 | W. H. H. (merchant). | Lemon extract. | Became blind then died. |
| 273 | W. T. Salmon, Okla. City, Okla. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 60 | W. from Ind. Ter. | Drank Columbian spirit. | Headache, dimness of vision, vomiting and was entirely blind for 43 hours. He improved slightly under pilocarpin and strychnia. |
| 274 | W. T. Salmon, Okla. City, Okla. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 54 | K. from Ind Ter. | Jamaica ginger, lemon extract and peruna. | Headache, vomiting, and other gastrointestinal symptoms, followed by blindness, optic atrophy, with narrowing of the retinal vessels. The atrophy remained permanent. |
| 275 | W. T. Salmon, Okla. City, Okla. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 43 | E. from Ind. Ter. | Drank 1½ pints of bitters. | Next morning headache, vomiting, dimness of vision. In 45 hours V. R. E. second ending fingers at 3 feet; V. E. = 20-200. |
| 276 | W. T. Salmon, Okla. City, Okla. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 24 | S. T. | Lemon extract for 3-4 days. | Complained of blindness, dyspnea and pain in the stomach. Died soon after. |
| 277 | W. T. Salmon, Okla. City, Okla. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 34 | H. | Wood alcohol. | Became dizzy, vomited, headache, pupils sensitive to touch, blind in 3 days, optic neuritis followed by atrophy. |
| 278 | Salmon, Okla. City, Okla. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 46 | Miss F. | Drank cologne spirits. . | Headache, tenderness of eyes, gastric disturbances. Blind in 5 days, papillo-macular atrophy. |
| 279 | Salmon, Okla. City, Okla. . | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | F | 19 | | | |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life | Mode of occurrence. | General effects and results. |
|-----|---------------------------------------|--|------|------|-------------------------------------|--|---|
| 280 | Salmon, Okla. City, Okla. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 63 | H..... | Wood alcohol..... | Violent headache, vomiting. Vision reduced R. E. = 20-200; L. E. = fingers at 3 feet. |
| 281 | Salmon, Okla. City, Okla. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 29 | M. Ind. Ter..... | Drank one pint of Columbian spirits. | Followed by vomiting and headache. Eyes tender on pressure. Result, much diminished vision, central scotoma and contracted fields. |
| 282 | Salmon, Okla. City, Okla. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 34 | S..... | Drank 4 bottles of Jamaica ginger. | Became semi-comatose and totally blind. At first improvement occurred but finally optic atrophy set in. |
| 283 | Dr. Saunders, Schenectady, N. Y. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 38 | McA. (steamfitter)..... | Drank wood alcohol.... | Followed by deep, labored breathing, face flush, skin bathed in sweat, restlessness, pain in stomach, pupils dilated. Became totally blind and death followed convulsive spasms. |
| 284 | Dr. Seales, Pine Bluff, Ark. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 46 | H. E. (hard drinker)... | Drank 6 ounces of wood alcohol. | Followed in 20 hours by severe vomiting and total blindness. Remained blind 36 hours after which vision improved. Nine months later R. E. = 1-20; L. E. = 1-100. Fields greatly contracted, all color perception lost, optic discs white, sluggish reaction to light. |
| 285 | Salmon, Okla. City, Okla. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 45 | M. O'C. (railroad section boss). | Drank three bottles of Jamaica ginger, some bay rum and Hostetter's bitters. | Was seized with violent intestinal irritation and became totally blind. He never recovered his eyesight. |
| 286 | Drs. Sneed & McReynolds, Dallas, Tex. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | Negro, barber, a chronic alcoholic. | Drank bay rum made up with wood alcohol. | Became and remained totally blind. |
| 287 | Dr. Smith, Detroit, Mich. | J. Am. Med. Assn., 43, 972, 1058, 1117, 1213, 1289 (1904). | M | 20 | ..... | 4-5 tumblers of wood alcohol. | Vision disturbed. Perception of light in R. E.; nerve white, all vessels attenuated. L. E. V = 10-200, nerve waxy white, vessels attenuated. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-------------|-------------------------------------|--|------|------|-------------------------------|--|---|
| 288 and 289 | Surgeon General of the Army. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | A and B..... | Drank wood alcohol diluted with water. | Followed by gastric pain, vomiting, dryness of mouth and throat, pupils dilated, vision dim. Both died soon after. |
| 290 | Surgeon General of the Army. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 29 | T. H..... | Drank methylated bay rum and Florida water. | Became totally blind, vision improved slightly until he could count fingers at 18 inches. There has been no improvement since. |
| 291 | Dr. Toms, Nyack, N. Y.. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | F | 45 | A. B. F (servant, alcoholic). | Drank $\frac{1}{2}$ pint of wood alcohol. | Became blind then died. |
| 292 | Dr. Van Kirk, Wheaton, Wash. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904)..... | M | 38 | T. P. (laborer)..... | Drank $\frac{1}{2}$ ounce of wood alcohol. | Became totally blind, vision improved slightly. At present vision in L. E. is light perception only; R. E. vision quite useful. |
| 293 | Dr. Weeks, N. Y. C. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 38 | E. V..... | Drank a cupful of wood alcohol. | On following day vision became impaired, since then there has been some improvement. Four months later V. R. E. = 30-40; L. E. = fingers at 8 feet. |
| 294 | Dr. Welsh, Grand Rapids Mich. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 15 | J. D. | Drank wood alcohol more than once, also Jamaica ginger. | Became totally blind and remained so. |
| 295 | Dr. Welsh, Grand Rapids, Mich. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 14 | J. M. | Drank wood alcohol.... | Became totally blind but vision improved to 3-200 in either eye. |
| 296 | Dr. White, Richmond, Va. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | .... | S. N..... | Drank a large quantity of Jamaica ginger. | Vision became impaired, since then it remained at 20-200 type at four inches. The diagnosis was retrobulbar neuritis, with atrophy of the papilla. Blind. |
| 297 | Dr. White & Williams, Richmond, Va. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904). | M | 21 | S. W. (clerk)..... | Drank 4 bottles of essence of lemon, each containing 2 ounces. | Became totally blind but his sight improved since to 3-20. |
| 298 | Dr. Vinton & Dean, Iowa City, Ia. | J. Am. Med. Assn., 45, 972, 1058, 1117, 1213, 1289 (1904).. | M | 37 | W. H. (printer)..... | Drank Jamaica ginger habitually. | Eyesight began to fail, he then became totally blind. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|------------------|---|--|------|------|---|--|---|
| 299 | Drs. Vinton & Dean,
Iowa City, I. | J. Am. Med. Assn., 43,
972, 1058, 1117, 1213,
1289 (1904). | M | 36 | C. F. (printer)..... | Drank 1 dozen small
bottles essence of lemon. | Became totally blind, dyspnoic, cyanotic, and extremities very cool. He was seized by convulsion and died soon after. |
| 300 | Dr. Widmeyer, Rolla,
N. D. | J. Am. Med. Assn., 43,
972, 1058, 1117, 1213,
1289 (1904). | M | | Indian, Turtle Mountain
Reservation. | Drank lemon extract
and 4 teaspoonful of
Florida water. | Had intestinal pain burning in stomach and nausea, vomited, had marked dysuria, and became totally blind. Of his nine companions, all died. |
| 301 | Dr. Woods, Baltimore,
Md. | J. Am. Med. Assn., 43,
972, 1058, 1117, 1213,
1289 (1904). | F | 40 | Laborer's wife..... | Drank 3-4 tablespoons
full Jamaica ginger
daily for several years
to improve digestion. | Vision impaired. |
| 302 | Dr. Bonia, Seattle, Wash. | J. Am. Med. Assn., 43,
972, 1058, 1117, 1213,
1289 (1904). | M | 32 | S. M. (German, painter) | Drank 3 ounces of Columbian spirits used in his shop for dissolving shellac. | Pulse weak, temperature subnormal, became totally blind. Blindness continued for three weeks when sight was gradually restored. |
| 303
to
327 | Sprague (1905)..... | Dominion Month., 24,
11. | M | | | Drank whiskey containing wood alcohol. | All died. |
| 328 | Koller (1905)..... | Mt. Sinai Hosp. Rep., 4,
376. | M | 42 | | Drank whiskey containing wood alcohol. | Became totally blind, sight improved to R. E. = 15-28; L. E. = 15-30. |
| 329 | Stirling (1905)..... | Ophth. Rev., 24, 38... | M | 41 | ..... | Drank 6 ounces wood alcohol. | Became totally blind, vision improved to R. E. = 1-20; L. E. = 1-10, total color blindness. |
| 330 | Jelliffe (1905)..... | Med. News, 86, 387.... | M | 34 | Constant drinker..... | Drank Columbian spirits in small quantities for 3 months thinking it to be ordinary alcohol. | Paralysis of extensors, drop-wrist, ptosis, and partial amblyopia. He recovered in 4 months except a blurring of vision. |
| 331
to
348 | Nazel (1905).....
Koller (1905)..... | J. Am. M. A., 45, 1560.
M. Rec., 63, 10..... | M | | | Drank wood alcohol....
Drank wood alcohol in some form. | Death followed.
Death followed. |
| 349 | Judd (1905)..... | Rep. Surgeon Gen. U. S.
Navy, 1905, p. 195. | M | | Private marine, habitual
drinker. | Drank one quart of
wood alcohol. | Died. |
| 350 | Saunders & Collier..... | Virochow-Hirsch, Jahres-
ber., 1905, 24, 239 | M | | | Drank wood alcohol.... | Became blind in 3 days. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|------------|-------------------------|--|-------|-------|-----------------------------|--|---|
| 351 | Strohmberg (1906)..... | Petersb. Med. Wchnschr.,
37, 55. | M | 46 | Farmer..... | Drank Kuntzen's balsam containing wood alcohol. | Became totally blind, vision. |
| 352 | Strohmberg..... | Petersb. Med. Wchnschr.,
37, 55. | M | 31 | Prisoner..... | Drank wood alcohol used to dissolve shellac. | Died. |
| 353 to 382 | Strohmberg..... | Petersb. Med. Wchnschr.,
37, 55. | | | | Wood alcohol drinking. | Reports of 30 deaths from wood alcohol drinking at a village wedding in Russia. |
| 383 to 402 | Strohmberg..... | Petersb. Med. Wchnschr.,
37, 55. | | | | Wood alcohol drinking. | Also of 20 people in another village (Russia) who died from wood alcohol poisoning. |
| 403 | Nagel & Krudner (1905) | J. Am. M. Assn., 1906,
18; Biochem. Zentr.,
1906, 802. | M | | | Drank one glass of methyl alcohol. | Became totally blind. |
| 404 | A. H. Bogue (1906)..... | Vermont Med. Month.,
12, 31. | M | 70 | | Drank ½ pint of what was supposed to be ordinary alcohol from Nov. 22 to 23. | Awoke with severe pain in chest, back and shoulders. Violent pain in stomach. Movement of jaws with pain. Finally died, 3 a. m. next day. |
| 405 | A. H. Bogue (1906)..... | Vermont Med. Month.,
12, 31. | M | 43 | | Drank probably ½ pint bottle of liquor. | Severe pain in stomach, chest and jaws 3 hours later (9 p. m.). At 10 he vomited. Died 1:30 a. m. Result of autopsy was negative. Stomach contents—considerable alcohol. |
| 406 | A. H. Bogue (1906)..... | Vermont Med. Month.,
12, 31. | F | 25 | | Drank ½ pint of same brand as above | (complained of pains just before 10 p. m. Went to sleep. Found dead by her husband at 6 a. m. |
| 407 | A. H. Bogue (1906)..... | Vermont Med. Month.,
12, 31. | M | 46 | | Drank one ounce of wood alcohol mixed with cider. | complained of inability to see distinctly; 9 p. m. grew worse, until totally blind at 12 p. m. At 12 p. m., suffered from heart failure, irregular and thready pulse, cold and covered with profuse perspiration. Under stimulants as strychnine, whiskey, etc. Almost fully recovered. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-------------------|-------------------------|------------------------------------|-------|-----------|--|--|--|
| 408 | A. H. Bogue (1906)..... | Vermont Med. Month.,
12, 31. | M | 40 | | Drank 4 ounces alcohol
through 2 days. | Inability to see next day. Weak,
irregular pulse. Given hypodermic
strychnine 1-50 gr. and spirits of
ammonia. Recovered to a certain
extent. Saw more clearly. Had
headache for 48 hours. |
| 409 | A. H. Bogue (1906)..... | Vermont Med. Month.,
12, 31. | M | 47 | | Drank one pint wood
alcohol. | Suffered from prostration. Some
indistinctness of vision. Otherwise
well. Did not have the usual head-
ache or blindness. |
| 410 | A. H. Bogue (1906)..... | Vermont Med. Month.,
12, 31. | M | 42 | | ½ pint of liquor as in 1
and 2. | Inability of co-ordination of move-
ments without slightest sense of
intoxication. Pain in stomach and
nausea; ate raw eggs and vomited
freely. Complained of mist before
eyes. Treatment with dose of
castor oil every two hours.
Died within an hour. |
| 411 | G. A. Wood..... | Internat. Clinic, 1, 68
(1906). | M | 45 | S. Knowles (private U.
S. A., alcoholic). | Drank wood alcohol.... | All died. |
| 412 | G. A. Wood..... | Internat. Clinic, 1, 68
(1906). | | | Indians..... | Drank Florida water
and lemon extract con-
taining wood alcohol. | Seven died; 10 suffered partial
blindness. |
| 421
to
422 | G. A. Wood..... | Brit. M. J., 2, 1855
(1906). | M | 20-
50 | Crew of a boat..... | Each drank from ¼ pint
to 1 pint of wood al-
cohol. | One died, the other suffered from the
effects. |
| 438
to
444 | G. A. Wood..... | Brit. M. J., 2, 1855
(1906). | M | | Military convicts..... | Drank partially purified
wood alcohol. | |
| 445
and
446 | G. A. Wood..... | Brit. M. J., 2, 1855
(1906). | | | | | |
| 447 | G. A. Wood..... | Brit. M. J., 2, 1855
(1906). | M | 41 | H. T. (laborer)..... | Drank a whiskey glass-
ful of wood alcohol. | Vision became impaired: to right
eye = 12-200, left eye = 20-200. |
| 448 | G. A. Wood..... | Brit. M. J., 2, 1855
(1906). | | | H. R. (Dane).....
tea. | Drank ½ cupful of wood
alcohol mixed with
tea. | Became blind, but vision improved
and then became worse again.
Four months later his vision was
shadow perception in both eyes. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-------------|-------------------------|--------------------------------------|------|------|-----------------------------|--|---|
| 449 and 450 | C. A. Wood..... | Brit. M. J., 2, 1855 (1906). | M | .... | Indians..... | Drank cheap whiskey adulterated with wood alcohol. | Both died. |
| 451 | C. A. Wood..... | Brit. M. J., 2, 1855 (1906). | M | .... | Two men from Winnipeg, Man. | Drank purified wood alcohol. | Died. Wood alcohol was determined to be the cause of the poisoning at the coroner's inquest. |
| 452 | (1906)..... | Chem. & Drug. Cir., July, 1906. 257. | M | .... | At a drinking bout..... | Drank wood alcohol obtained from a druggist. | Died. |
| 454 | (1906)..... | Chem. & Drug. Cir., July, 1906. 257. | M | .... | At a drinking bout..... | Drank wood alcohol obtained from a druggist. | Died. |
| 455 | (1906)..... | Chem. & Drug. Cir., July, 1906. 257. | M | .... | At a drinking bout..... | Drank wood alcohol obtained from a druggist. | Became seriously ill; recovered. |
| 456 | (1906)..... | Chem. & Drug. Cir., July, 1906. 257. | M | .... | At a drinking bout..... | Drank wood alcohol obtained from a druggist. | Became almost totally blind. i |
| 457 | Stirling (1905)..... | Ophth. Rev., 1905, 24, 33. | M | 41 | ..... | Drank 6 oz. of wood spirit. | Became totally blind, but his vision improved since to R. E. = 1-20; L. E. = 1-10. Pupils widely contracted to light, total color blindness. Blindness, in Rigu, Russia, from methyl alcohol poisoning. |
| 458 | Krudner (1907)..... | Arch. d'Ophth., 716.... | .... | .... | ..... | Drank methyl alcohol.. | Died. |
| 459 | H. E. Odell (1907)..... | U. S. Nav. M. Bull., Wash., 1, 99. | M | .... | U. S. Navy..... | Drank bay rum and water made up with wood alcohol. | Died. |
| 460 | H. E. Odell (1907)..... | U. S. Nav. M. Bull., Wash., 1, 99. | M | .... | U. S. Navy..... | Drank bay rum and water made up with wood alcohol. | Died. |
| 461 | H. E. Odell (1907)..... | U. S. Nav. M. Bull., Wash., 1, 99. | M | .... | U. S. Navy..... | Drank bay rum and water made up with wood alcohol. | Died. |
| 462 | Montgomery (1907)..... | Brit. M. J., 1, 375.... | M | .... | ..... | Drank large quantity of methyl alcohol. | Became and remained totally blind. |
| 463 | Tschermolosew (1907)... | Ophth. Klinik..... | M | .... | Sailor..... | Drank two glasses of methylated alcohol. | Two days apathy; vomiting followed, and visual disturbance. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life | Mode of occurrence. | General effects and results. |
|------|--------------------------|---|------|------|---|---------------------------------------|---|
| 464. | Tschernolosew (1907)... | Ophth. Klinik..... | M | ... | Sailor..... | Drank four glasses of methyl alcohol. | Two days apathy; vomiting followed, and visual disturbance. |
| 465. | Lowenthal (1907)..... | Klin. Monatsbl., 235..... | M | 29 | ..... | Drank tea mixed with wood alcohol. | Next day he vomited; the day after that blindness; dilated, reactionless pupils, myopia with staph. post, optic nerves pale, vessels pale. Blindness in Right, Russia, from methyl alcohol poisoning. |
| 466 | Krudner..... | Zeitschr. Aug., 16, Ergänz. Hef. C. Bl. of A., 216..... | ... | ... | ..... | Drank methyl alcohol. | Blindness in Right, Russia, from methyl alcohol poisoning. |
| 467 | Krudner (1907)..... | ..... | ... | ... | ..... | Drank methyl alcohol. | Blindness in Right, Russia, from methyl alcohol poisoning. |
| 468 | Sinkowitch (1908)..... | Kasanski Medizinski J., 1908, 399. | M | 46 | ..... | Drank two glasses of "Kinder balsam." | Became totally blind; optic nerves atrophied, vessels contracted; no improvement two months later. Totally blind. |
| 469 | Sinkowitch (1908)..... | Kasanski Medizinski J., 1908, 399. | M | 52 | ..... | Drank 1 lb. of "Kinder balsam." | Vision impaired, R. E. 5cc.; L. E. 9 cc. concentric contraction, neuritic; optic nerve, atrophy, vessels contracted. |
| 470 | Sinkowitch (1908)..... | Kasanski Medizinski J., 1908, 399. | M | 42 | Syphilitic..... | Drank 1 lb. "Kinder Balsam." | Vision impaired; permanently R. E. 6 cc.; L. E. 5-6 cc. Amaurosis, optic nerves atrophied. |
| 471 | Sinkowitch (1908)..... | Kasanski Medizinski J., 1908, 399. | M | 22 | ..... | Drank 1 lb. "Kinder balsam." | Vision impaired; permanently R. E. 6 cc.; L. E. 5-6 cc. Amaurosis, optic nerves atrophied. |
| 472 | Sinkowitch (1908)..... | Kasanski Medizinski J., 1908, 399. | M | 22 | ..... | Drank 2 lbs. "Kinder balsam." | Pain in head and breast; vision impaired permanently to R. E.=20 cc.; L. E.=3 cc. neuritic optic nerves; atrophy with contracted vessels. |
| 473 | Kassas (1908)..... | Nowojen Medizijnje, 1908, 357. | F | .. | In Russia..... | Drank diluted methyl alcohol. | Became blind. |
| 474 | A. H. Pearce (1909)..... | Boston M. & S. J., 1909, CIX, 237. | M | 50 | Employed in factory. Addicted to habit. | Drank Columbian spirits. | Complained of headache, dizziness, vomiting, abdominal pains. That night became totally blind. Death followed later. |
| 475 | A. H. Pearce (1909)..... | Boston M. & S. J., 1909, CIX, 237. | ... | ... | ..... | Drank 1½ ounces of Colonial spirits. | Became ill; worse next day; complained of epigastric pain, nausea, and great prostration. Next morning became unconscious. Died later. |

| No. | Reports and advt. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|------------|-------------------------|--|-------|-------|--|---|---|
| 476 | A. Natanson (1909)..... | Deutsch Med. Wochensh. Berl., 1909, No. 45, 86, 971. | M | 45 | ..... | Drank $\frac{1}{2}$ glassful of "Kinder balsam." | Vision became permanently impaired. |
| 477 to 502 | Kassas (1908)..... | Nowoje w. Medizine, 1908, 357. | ..... | ..... | Reports of 26 persons in Waldimir-Wolynsk, Russia. | Drank methyl alcohol (jack spirit). | 14 died. |
| 503 to 517 | Kassas (1908)..... | Nowoje w. Medizine, 1908, 357. | ..... | ..... | Reports of 15 wedding guests at a Russian feast. | Drank methyl alcohol... | Four died; one woman became totally blind and one man became totally blind |
| 518 | Gruning..... | Festschr. Deutsch. Hosp., 1909. | M | 40 | ..... | Drank $\frac{1}{2}$ bottle of whiskey. | Next morning was blind. 8 days later no improvement. On treatment improved to 1-200 in right and 1-40 in left eye. |
| 519 | Bachmann (1909)..... | U. S. Nav. Bull., 3, 33. | M | ..... | Chief yeoman on U. S. S. St. Louis. | Drank fluid from rubber cement mostly wood alcohol. | Died. Post mortem: Stomach empty; mucosa dark and injected, small hemorrhages into membrane visible over entire surface. Lungs: lower lobes congested and consistency weakened; entire lungs floated. |
| 520 | Bachmann (1909)..... | U. S. Nav. Bull., 3, 33. | M | ..... | Blacksmith on U. S. S. St. Louis. | Drank fluid from rubber cement mostly wood alcohol. | Died. Post mortem: hemorrhagic points over mucosa of stomach; liver and lungs congested. |
| 521 | Bachmann (1909)..... | U. S. Nav. Bull., 3, 33. | M | ..... | Fireman on U. S. S. St. Louis. | Drank fluid from rubber cement mostly wood alcohol. | Died. Post mortem: small hemorrhages part of mucosa of stomach viscid yellow mucous adherent to membrane. Liver and lungs congested. |
| 522 | Bachmann (1909)..... | U. S. Nav. Bull., 3, 33. | M | ..... | Electrician on U. S. S. St. Louis. | Drank fluid from rubber cement mostly wood alcohol. | Vomited, pulse 110, pupils dilated, vision dim. Improved, and at time of discharge pupils were dilated and he could barely distinguish fingers 18 inches from eyes. |
| 523 | Gruning (1909)..... | Festschr. Deutsch. Hosp. | ..... | ..... | (Young)..... | Drank cheap wine adulterated with methyl alcohol. | Became totally blind but vision improved to R. E. = 1-20; L. Eye = 1-200. |

| No. | Reports and date.. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|--------------------|--|------|------|---|---|--|
| 524 | C. Koller..... | J. Am. Med. Assn., 1910, 1866. | F | .... | Mrs. M. D. (temperate habits.) | Drank about one tablespoonful of brandy adulterated with wood alcohol. | Vision was impaired 7 weeks after; the vision in each eye was 20-50. |
| 525 | Felletar..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | M | .... | Andreas Cs. Infantry soldier. Was drunk at times. | Drank wood alcohol. | Died. Methyl alcohol was found in the urine of the victim. |
| 526 | Felletar..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | M | .... | Sigmund K., orderly. Drunk at times. | Drank wood alcohol.... | Died. Methyl alcohol was found in the urine of the victim. |
| 527 | Felletar..... | Pest. Med. Chir. presse, 47, 215, 223, 231 (1911). | M | 24 | A man from Miskocz, Austria. | Drank wood alcohol.... | Died. |
| 528 | Felletar..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | F | 30 | ..... | Drank wood alcohol.... | Died. |
| 529 | Felletar..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | F | 56 | F. Fest..... | Drank tea with rum 2-3 deciliters. The rum was adulterated with wood alcohol. | Died. |
| 530 | Felletar..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | M | 58 | F. Fest..... | Drank tea with rum 2-3 deciliters. The rum was adulterated with wood alcohol. | Died. |
| 531 | Felletar..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | F | 24 | B. Fest..... | Drank tea with rum 2-3 deciliters. The rum was adulterated with wood alcohol. | Died. |
| 532 | Felletar..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | F | 30 | F. Petrusovics..... | Drank tea with rum 2-3 deciliters. The rum was adulterated with wood alcohol. | Died. |
| 533 | Felletar..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | F | 51 | K. Flekats..... | Drank tea with rum 2-3 deciliters. The rum was adulterated with wood alcohol. | Died. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|------------|--------------------------------------|--|------|------|--|--|---|
| 534 | Felleter..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | M | 53 | I. Namesanski..... | Drank $\frac{1}{2}$ liter of rum together with his friend Mullner. Rum was adulterated with wood alcohol. | Died; became blind before death. Methyl alcohol found in the body and in the urine. |
| 535 | Felleter..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | M | 53 | F. Mullner..... | Drank $\frac{1}{2}$ liter of rum together with his friend Namesanski. Rum was adulterated with wood alcohol. | Died. Methyl alcohol found in the blood and urine. |
| 536 | Felleter..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | F | .... | J. Natter..... | Drank tea with rum adulterated with wood alcohol. | Died. |
| 537 | Felleter..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | M | .... | M. Fest..... | Drank tea with rum adulterated with wood alcohol. | Died. |
| 538 to 567 | Felleter..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | .... | .... | 30 people in a town of Torontaler, Komitatz, Austria. | Drank adulterated liquors. | 13 died. |
| 568 to 580 | Felleter..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | .... | .... | 13 people in Miskolcz, Austria. | Drank adulterated rum | 8 died; 5 became blind. |
| 581 to 592 | Felleter..... | Pest. Med. Chir. Presse, 47, 215, 223, 231 (1911). | .... | .... | 12 in Groswalden..... | Drank adulterated liquors. | Died. |
| 593 to 722 | Stedtmann & Magnus-
Levy. (1912). | Berl. Klin. Wochschr., 43, 193. | | | A large number of persons in Berlin drank brandy composed of 2-3 methyl alcohol and 1-3 ethyl alcohol. | Drank wood alcohol in brandy. | Out of 130 cases, 58 died; in 42 cases the vision was impaired, and 30 recovered. |
| 723 | Pick..... | Berl. Klin. Wochschr., 1912, 888. | M | 33 | M. Paul (laborer)..... | Drank brandy adulterated with wood alcohol. | Impairment of vision due to amaurosis followed by death. |
| 724 | Pick..... | Berl. Klin. Wochschr., 1912, 888. | M | 32 | G. Willy, (skilled workman). | Drank brandy adulterated with wood alcohol. | Died. |
| 725 | Pick..... | Berl. Klin. Wochschr., 1912, 888. | M | 43 | August H. (locksmith). | Drank brandy adulterated with wood alcohol. | Died. |

II. SUMMARY OF CASES OF POISONING BY INHALATION OF WOOD ALCOHOL.

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|---------------------------------------|-----------------------------|------|------|--|--|---|
| 1 | H. Gifford, Omaha, Neb., Sept., 1899. | Ophth. Rec., 8, 441.... | M | 31 | Painter, moderate smoker and drinker. | Shellacked beer vats 20x 11. The temperature of vats was 70°F. The shellac was made up with Columbian spirits. | After 2 weeks nausea and headache. Became totally blind but since then sight improved so that R. E. = fingers at 3 ft.; L. E. = fingers at 1 ft. Discs opaque white. |
| 2 | Pattilo, Dec., 1899, Chicago. | Ophth. Rec., 8, 539.... | M | 36 | Painter, no drinker.... | Shellacked beer vats 20x 11. The temperature of vats was 70°F. The shellac was made up with Columbian spirits. | End of 4 day's dizziness headache, on 6th day became totally blind; vision improved so that R. E. = fingers at 3 ft.; disc bluish tint; L. E. = light perception only, disc white, vessels slightly contracted. |
| 3 | Pattilo, Dec., 1899, Chicago. | Ophth. Rec., 8, 599.... | M | 36 | Painter, no drinker.... | Shellacked beer vats. Shellac was mixed with Columbian spirits. Vats badly vented. | Became totally blind, but vision improved so that R. E. = fingers at 3 ft.; L. E. = fingers at 1 ft. |
| 4 | Wurdemann..... | Ophth. Rec., 2, 995.... | M | 33 | Painter, no drinker.... | Shellacked beer vats 6 days using Columbian spirits as a solvent for the shellac. | Became totally blind but sight has improved since. |
| 5 | Wurdemann..... | Ophth. Rec., 2, 995.... | M | .... | Painter..... | Varnished vats with a mixture composed of shellac and Columbian spirits. | Died. |
| 6 | Wurdemann..... | Ophth. Rec., 2, 995.... | M | .... | Painter..... | Varnished vats using Columbian spirits as solvent. | Methyl alcohol amaurosis set in. |
| 7 | Hale, 1901..... | Ophth. Rec., 1901, 10, 662. | M | .... | Cooper, no drinker.... | Inhaled wood alcohol vapors from shellac. | Amblyopia set in. |
| 8 | Hale, 1901..... | Ophth. Rec., 1901, 10, 662. | M | .... | Cooper, no drinker.... | Inhaled wood alcohol vapors from shellac. | Amblyopia set in. |
| 9 | Schweinitz, June, 1901. | Ophth. Rec., 1901, 349. | M | 39 | Painter. Tobacco and alcohol moderate. | Used wood alcohol in varnish and to hands and arms after work. | Chilliness and pain in legs in morning, became totally blind and has remained so. |

| No. | Reports and date. | Journal. | Sex. Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|--|---------------------------|-----------|--|---|--|
| 10 | Herbert, 1902. | Am. Med., 3, 300. | M 38 | Painter. | Inhaled methyl alcohol and charcoal fumes. | Had to give up work because of nausea and dizziness. Became totally blind but vision improved to V = 6-V+ for distance and for near work + 0.50-D with which he could read the finest type. |
| 11 | Stricker. | Ophth. Rec., 6, 249. | M | Varnisher. | Inhaled the vapors from shellac which was dissolved in wood alcohol. | Anaesthesia set in. |
| 12 | Conboy, 1904. | J. Mich. M. Soc., 3, 536. | M | Cleaner. | Inhaled wood alcohol | Became and remained totally blind. |
| 13 | Conboy, 1904. | J. Mich. M. Soc., 3, 536. | M | Cleaner. | Inhaled wood alcohol while cleaning | Became and remained totally blind. |
| 14 | Conboy, 1904. | J. Mich. M. Soc., 3, 536. | F 56 | Healthy woman. No history of blindness. | Washed head and face with wood alcohol daily. | Vision impaired; V. R. 8-20; V. L. 8-20. |
| 15 | Dr. Todd, Minneapolis, Minn. | | M 45 | H. T. J. (painter). No previous history of disease. drinks one glass of liquor in six months | Varnished and shellacked in small room. Varnish and shellac was dissolved in Columbian spirits. | Vision became dim but returned to normal in two months. |
| 16 | C. Wood & J. Buller. | J. Am. M. Assn., 1904. | M [56 | Cleaner and dyer. | Had been cleaning and dyeing clothes in alcoholic preparation. Did not drink any wood alcohol. | Headache and vomiting. Vision reduced to perception of light in 10 days. Under pilocarpin recovered most of his sight in 61 days. |
| 17 | Buller & Wood, 1904, Cincinnati, Ohio. | J. Am. M. Assn. | M 44 | W. E. C. (painter) | Had been varnishing and shellacking inside of closets in a Cincinnati hotel. The shellac was dissolved in wood alcohol. | Became dizzy while at work, had an intense headache, stopped work and got some fresh air. Returned to work and was again attacked by nausea, vomiting and headache and discontinued work. On 3-4 day his eyesight began to fail and at end of week central vision was 5-100. Had double optic neuritis, followed in a few months by partial atrophy and large central scotoma in both eyes. When last seen was unable to work on account of impairment to sight. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|---------------------------------|---------------------|-------|-------|-----------------------------|--|---|
| 18 | Dr. Driver, Norfolk Va.. | J. Am. M. Assn..... | M | 54 | E. L. (white)..... | Shellacked the benches and interiors of several schools. Shellac was dissolved in wood alcohol. | He awoke two mornings later totally blind, he remained blind for two weeks when sight began to improve, especially in the left eye. In last two years vision in left eye improved some. |
| 19 | Dr. Gifford, Omaha, Neb. | J. Am. M. Assn..... | F | 35 | Woman..... | Had been burning a methyl alcohol lamp in her room to warm water for 2-3 months. She never drank any. | Vision impaired 20-200 in each eye. Vision began to improve and rose to 20-200 in R. E. and 20-70 in L. E. |
| 20 | Dr. Lippincott, Pittsburgh, Pa. | J. Am. M. Assn..... | M | 44 | S. E. S. (varnisher).... | Worked a whole day varnishing tanks in a brewery. The varnish was dissolved in wood alcohol. | Two hours after ending work went into a comatose condition, which lasted 24 hours. When he awoke vision was impaired but improved since. Two years later vision of L. E. failed entirely. Soon after the poisoning he was taken with left-sided pneumonia which developed into tuberculosis of which he died two years later. |
| 21 | Dr. North, Brooklyn, N. Y. | J. Am. M. Assn..... | M | 48 | H. E. W. (varnisher).... | Was employed as a varnisher of beer vats. The varnish was dissolved in wood alcohol. The vats were badly ventilated. | Vision became impaired 20-70 in each eye, optic papillae pale. On prompt treatment vision improved almost to normal in each eye. |
| 22 | Dr. North, Brooklyn, N. Y. | J. Am. M. Assn..... | M | 35 | A. H. S. (shellacker).... | Was employed as beer vat shellacker. The vats were ill ventilated. | Vision became impaired to 10-200 with every indication of optic atrophy, the discs being very white. Long continued treatment brought improvement of vision to 20-50 in each eye. |
| 23 | Dr. Solomon, Okla. City, Okla. | J. Am. M. Assn..... | ..... | 6 mo. | A. J. (infant)..... | Had been burning a wood alcohol lamp by the crib in which the infant slept. | Vision became impaired, pupils contracted, optic discs pale, arteries narrow. Vision improved, total recovery. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|--------------------------------|---|------|------|--|--|--|
| 24 | N. T. Wilson, Elizabeth, N. J. | J. Am. M. Assn. | M | 42 | O. E. H. (mixer) | Had been mixing shellac with Columbian spirit in cabinet factory. | Vision was reduced to 10-200 discs were pale and vessels very small. He frequently bathed his hands in the alcohol to remove the shellac. He never drank any of it. Became totally blind. |
| 25 | ..... | Chem. Drug. Circ., Dec., 1906, 449. | M | .... | Painter. No drinker, no history of blindness, etc. | Used wood alcohol to clean the floor of a room. Kept doors and windows closed. | Became totally blind. |
| 26 | ..... | Chem. Drug. Circ., Dec., 1906, 449. | M | 45 | Painter. No drinker... | Used wood alcohol to clean the floor of a room. Kept doors and windows closed. | Became and remained totally blind. |
| 27 | ..... | Chem. Drug. Circ., Dec., 1906, 449. | M | .... | Painter. No drinker... | Used wood alcohol to clean the floor of a room. Kept doors and windows closed. | Became and remained totally blind. |
| 28 | Jellife, 1905. | Med. News, 86, 387. | M | .... | Painter. | Used shellac dissolved in wood alcohol on furniture. | Suffered from hyperesthesia, paros- thesia, pain in back of hands and forearms. Also edema or puffiness. |
| 29 | Jellife, 1905. | Med. News, 86, 387. | M | .... | Painter. | Used shellac dissolved in wood alcohol on furniture. | Suffered from hyperesthesia, paros- thesia, pain in back of hands and forearms. Also edema or puffiness. |
| 30 | Hawes, 1905. | Bost. M. S. J., 153, 525. | M | 53 | Painter. Did not drink wood alcohol. Sober, did not smoke to ex- cess. | Used wood alcohol to remove paint from furniture and in shel- lacs. | Became and remained totally blind. |
| 31 | Stratton & Brown, 1906. | Hearing before Ways & Means Comm. on Free Alcohol, 59th Cong. 1st Sess. | M | 32 | Worked in hat factory stiffening. | Used wood alcohol in stiffening hats for 5½ years. | Had to discontinue work on account of impaired vision due to wood alcohol. Vision when last seen R. E.=15-30; L. E.=15-20. Gave up work on account of inflam- mation of eyes. Vision R. E.=15-20; L. E.=15-20. |
| 32 | Stratton & Brown, 1906. | Hearing before Ways & Means Comm. on Free Alcohol, 59th Cong. 1st Sess. | M | 38 | Hat stiffener. | Worked in wood alcohol 2½ years. | |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|------------------------|---|------|------|--|---|--|
| 33 | Stratton & Brown, 1906 | Hearing before Ways & Means Com. on Free Alcohol, 59th Cong., 1st Sess. | M | 46 | Hat stiffener. | Worked in wood alcohol 32 years. | Discontinued work on account of failing vision. He is still able to distinguish large objects but is unable to recognize features at a distance of a few feet. Vision for reading totally lost; is able to recognize test card letters 1-40 with each eye. |
| 34 | Gifford, 1906. | Ophth. Rec., 15, 274. | M | 46 | Jack of all trades. | Used shellac and stain dissolved in wood alcohol in a room where the windows were closed. | Became totally blind, sight improved to R. E. counting fingers extrinsically 6 inches; L. E. fingers at 1 ft. Field of R. E. gone, except about one-third of temporal half; L. E. field of temporal half with 10° of center gone. |
| 35 | Gifford, 1906. | Ophth. Rec., 15, 274. | M | 32 | Photographer. | Cleaned plates with wood alcohol in small, poorly ventilated room. | Was seized with paralysis of arms and legs, pain in sides and decrease in sight. Died. |
| 36 | Phillips, 1906. | Ophth. Rec., 10, 634. | M | 53 | Distributor of paints and alcohols in store-room of paint factory. | Spilled a quart of wood alcohol on feet and floor and remained in same room for some hours. | Became dizzy after he left the room sight became dim. Later became totally blind. |
| 37 | Stratton & Brown. | Ways & Means Com., 1906. | M | 31 | Hat stiffener. | Worked 13½ years in wood alcohol. | Had to use cocaine for past 10 years to relieve pain in eyes in order to work. Suffers from catarrh in nose and throat, membranes of nose intensely congested. Bronchial scales over chest, 8 in of hands worn so that they crack and bleed easily. |
| 38 | Stratton & Brown. | Ways & Means Com., 1906. | M | 47 | Hat stiffener. | Worked in stiffening room with wood alcohol 16 years. | Was obliged to use cocaine in order to continue work, finally had to give up that branch entirely. Cannot see to read at night, optic nerve cupped, vision diminished in both eyes. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|-----------------------|-----------------------------|------|------|-----------------------------|--|---|
| 39 | Stratton & Brown..... | Ways & Means Com.,
1906. | M | 42 | Hat stiffener..... | Worked 15 years in hat stiffening department. | Eyes became irritated and inflamed; at start could not see in bright light or read night. Present vision is R. E.=15-40; L. E.=15-70, optic nerves cupped, veins distended and tortuous, choroid detached from nose, nose membranes congested and swollen, throat congested. Dry cough, lungs have moist bronchial scales on both sides. Was affected by the wood alcohol so that he was unable to open his eyes for 3 days at a time. Is unable to use eyes any evening after working. Secretion from eyes, vision dim, optic discs congested, is unable to use test type. Nasal membrane congested, pharynx and upper larynx strongly congested, bronchial scales over entire chest. Trouble with eyes, discharges from nose and cough. Is unable to read at night after work, intolerance to light conjunctiva congested. Has to stop $\frac{1}{2}$ to $\frac{1}{4}$ hour several times each day to recover from the effects of the alcohol on his eyes. Has to be in a dark room one hour after work. Eyes are always glued together in the morning. Suffers from dizziness while at work. Eyes are red and fiery, is unable to read. Vision R. E.=12-50; L. eye = 12-50. |
| 40 | Stratton & Brown..... | Ways & Means Com.,
1906. | M | 28 | Hat stiffener..... | Worked in stiffening room 14 years. Using wood alcohol for the stiffening. | |
| 41 | Stratton & Brown..... | Ways & Means Com.,
1906. | M | 20 | Hat stiffener..... | Worked in wood alcohol 4 years. | |
| 43 | Stratton & Brown..... | Ways & Means Com.,
1906. | M | 49 | Hat stiffener..... | Worked in wood alcohol two years. | |
| 44 | Stratton & Brown..... | Ways & Means Com.,
1906. | M | 27 | Hat stiffener..... | Worked in hat stiffening department 13 years. | Vision dim, eyes inflamed, is only able to work after using cocaine; lids thickened, optic discs show excessive cupping. Blind spot three times the normal size in each eye. Pharynx and larynx congested. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|-----|-------------------------|--|------|-------|--|--|--|
| 45 | Stratton & Brown, 1906. | Hearing before Ways & Means Com. | M | 32 | Hat stiffener..... | Worked with wood alcohol 12 years. | Had to give up work on account of inflammation of eyes and nasal passages also. Vision at present R. E. = 15-70; L. E. = 15-50. Is not able to read. |
| 46 | Stratton & Brown, 1906. | Hearing before Ways & Means Com. | M | 36 | Hat stiffener. Strong and healthy. No drinker. | Worked with wood alcohol 4 years. | Had to discontinue work on account of pain in eyes and dimness of vision. Vision at present R. eye = 15-20; L. E. = 15-30. |
| 47 | Stratton & Brown, 1906. | Hearing before Ways & Means Com. | M | 44 | Jeweler..... | Worked in wood alcohol an hour or two each day for 3 weeks. | Eyes began to trouble him with an intense conjunctivitis and ulceration of both cornea, followed by falling vision. Had to give up watchmaking on account of conjunctivitis. |
| 48 | Stratton & Brown, 1906. | Hearing before Ways & Means Com. | M | 18 | Hat stiffener..... | Worked in wood alcohol six months. | Was obliged to give up work on account of burning in eyes and dimness of vision. Vision R. E. at present = 15-20; L. E. = 15-20. Became blind and kidneys were affected. |
| 49 | Torry, Lynn, Mass..... | Hearing Ways & Means Com. on Free Alcohol, 1906. | M | ..... | Painter..... | Did not drink any wood alcohol. Used shellac dissolved in Columbian spirits for polishing. | |
| 50 | Burton, Lynn, Mass..... | Hearing Ways & Means Com. on Free Alcohol 1906. | M | ..... | ..... | Did not drink any wood alcohol. Used shellac dissolved in Columbian spirits for polishing. | |
| 51 | C. A. Wood, 1906..... | Inter. Clinic, I, 68..... | M | ..... | S. E. S. (varnisher)..... | Varnished tanks in a brewery, using varnish mixed with wood alcohol. | Had a bad effect on eyes and kidneys. Became totally blind. |
| 52 | C. A. Wood, 1906..... | Inter. Clinic, I, 68..... | M | 35 | A. H. S. (varnisher), healthy, weighed 190 pounds. | Varnished the interior of ill ventilated vats with varnish dissolved in wood alcohol. | Vision was impaired to 10-200 in each eye, central sight to 20-50. The optic nerves became atrophied, discs being white. |

| No. | Reports and date. | Journal. | Sex. | Age. | Occupation, habits of life. | Mode of occurrence. | General effects and results. |
|----------|-----------------------------------|---|-------|-------|---|---|--|
| 53 | C. A. Wood, 1906..... | Brit. M. J., 2, 1855.... | M | 45 | Frank P. (storekeeper in piano factory. Healthy, weighed 210 pounds). | Poured wood alcohol from 5 gallon cans and mixed it with shellac. | ..... |
| 54 | Stricker..... | Ophth. Yr. Book., 6, 249 | ..... | ..... | Shellacker..... | Inhaled wood alcohol | Methyl alcohol amaurosis set in. |
| 55 | Carhart, 1908..... | Am. Med., 1908, 3, 176.
Man. Eye & Ear.
Hosp., Rep. N. Y. | M | 23 | Painter..... | Shellacked beer vats... | Had attack of vertigo and nausea, next day complained of imperfect vision. Then became totally blind. R. E. = to perceive large object. L. E. = 3-200. |
| 56 | Carhart, Lancet-Clinic..
1909. | Jackson, Ophth. Yr.
Book, 6, 249. | M | | | Shellacked beer vats... | Vision faint. Light perception in left eye. None in right. Moderate optic neuritis. Vision gradually improved until R. E. could detect moving shadows, L. E. = 3-200. Became and remained totally blind. |
| 57 | | N. Y. State Dept. Labor
Bull. No. 51, 1912. | M | 30 | Varnisher in brewery... | Varnished vats in a brewery; the varnish was dissolved in wood alcohol. | Died. |
| 58 | | N. Y. State Dept. Labor
Bull. No. 51, 1912. | M | 27 | Varnisher in brewery... | Varnished vats in a brewery; the varnish was dissolved in wood alcohol. | Became blind. |
| 59 | ..... | ..... | M | 19 | Type cleaner..... | Used wood alcohol to clean type. | Died. |
| 60 | A. S. Mitchell..... | ..... | M | ..... | Varnisher..... | Varnished beer vats with shellac dissolved in wood alcohol. | 2 died. The other 2 went blind. |
| 61 to 64 | ..... | ..... | M | ..... | Varnishers. 4 men..... | Varnished beer vats with shellac dissolved in wood alcohol. | ..... |

APPENDIX D.*

WOOD ALCOHOL MANUFACTURERS IN THE UNITED STATES.

| | |
|---|-----------------------------|
| Barclay Chemical Co. | Laquin, Pa. |
| Boyer City Chemical Co. | Boyer City, Mich. |
| Beerston City Acetate Co. | Beerston, N. Y. |
| John Bartley | Mt. Alton, Pa. |
| Buckhannon Chemical Co. | Selbyville, W. Va. |
| Cadillac Chemical Co. | Cadillac, Mich. |
| Cummer-Diggins Co. | Cadillac, Mich. |
| Clawson Chemical Co. | Ridgway, Pa. |
| Custer City Chemical Co. | Custer City, Pa. |
| Coryville Chemical Co. | Bradford, Pa. |
| M. J. Corbett & Co. | Binghamton, N. Y. |
| Corbett & Stuart. | Binghamton, N. Y. |
| Day Chemical Co. | Westline, Pa. |
| Desmond Charcoal and Chemical Co. | Thompsonville, Mich. |
| Duck Harbor Lumber and Chemical Co. | Lookout, Pa. |
| East Jordan Chemical Co. | East Jordan, Mich. |
| Forest Chemical Co. | Sheffield, Pa. |
| Gray Chemical Co. | Port Alleghany, Pa. |
| Genesee Chemical Co. | Genesee, Pa. |
| Gaffney Wood Products Co. | Galeton, Pa. |
| Heinemann Chemical Co. | Olean, N. Y. |
| James Mfg. Co. | Kane, Pa. |
| Thomas Keery Co. | Hancock, N. Y. |
| Kinzua Valley Chemical Co. | Williamsport, Pa. |
| Keelor Chemical Co. | Wetmore, Pa. |
| Keystone Wood Products Co. | Olean, N. Y. |
| Lake Superior Iron and Chemical Co. | Detroit, Mich. |
| Lamont Chemical Co. | Kane, Pa. |
| Lackawanna Chemical Co. | Olean, N. Y. |
| Lewis Run Mfg. Co. | Bradford, Pa. |
| Liberty Wood Products Co. | Port Alleghany, Pa. |
| McKean Chemical Co. | Williamsport, Pa. |
| Mashek Chemical and Iron Co. | Wells, Mich. |
| Marvindale Chemical Co. | Bradford, Pa. |
| Minard Run Chemical Co. | De Golia, Pa. |
| Maryland Wood Products Co. | Maryland, N. Y. |
| Mt. Hope Chemical Charcoal Works. | Mt. Hope, Pa. |
| National Chemical Co. | Galeton, Pa. |
| Newton Chemical Co. | Olean, N. Y. |
| Nansen Chemical Co. | Kane, Pa. |
| Nusbaum Chemical Co. | Bradford, Pa. |
| Oswayo Chemical Co. | Oswayo, Pa. |
| Otto Chemical Co. | Williamsport, Pa. |
| Penn Chemical Co. | Ridgway, Pa. |
| E. D. Penwarden. | Carley Brook, Pa. |
| Riefler & Sons. | Honesdale, Pa. |
| Risley Lumber Co. | Walton, N. Y. |
| R. G. Roosa. | Willowemoc, N. Y. |
| Russell Chemical Co. | Russell, Pa. |
| Straight Creek Chemical Co. | Olean, N. Y. |
| Susquehanna Chemical Co. | Olean, N. Y. |
| A. B. Smith Chemical Co. | White Bldg., Buffalo, N. Y. |
| Sullivan Chemical Co. | Acidalia, N. Y. |
| Scott Chemical Co. | Sherman, Pa. |
| Stamford Chemical Co. | Stamford, Vt. |
| Smethport Chemical Co. | East Smethport, Pa. |
| Starrucca Chemical Co. | Starrucca, Pa. |
| G. H. Treys & Co. | Binghamton, N. Y. |
| Geo. I. Treys. | Cooks Falls, N. Y. |
| Vandalia Chemical Co. | Olean, N. Y. |
| Wisconsin Chemical Co. | Hackley, Wis. |
| Wright Chemical Co. | Ridgway, Pa. |
| Wyman Chemical Co. | Port Alleghany, Pa. |

* Courteously revised by Mr. Wm. S. Gray, President of Gray & Co., 76 William Street, New York.

APPENDIX VII

REPORT ON THE DANGERS TO WORKERS
IN THE
MANUFACTURE AND USE OF COMMERCIAL ACIDS
BY
DR. CHARLES F. McKENNA.



THE MANUFACTURE AND USE OF COMMERCIAL ACIDS

The manufacture of acids is associated in the mind of the general public with notions of great hazard to life and health. Those who would trespass boldly on other properties are more easily warned away from acid works. Firemen called to enter there in the discharge of their duties feel more apprehension than they experience in structures of much greater size. Their extra caution may well be needed by reason of such dangers as traps in flooring, unguarded vats and other sources of risk; but its basis mostly lies in the mystery surrounding the processes and substances involved. They are generally supposed to be ill-smelling or corrosive, or poisonous or explosive in some vague way, and as everything unknown is taken to be unsafe we have a large field for concern amongst the public over an industry in which the workmen themselves frequently manifest little or no disquietude.

In many so-called acid works the conditions, and often the substances themselves, are quite incapable of making for serious danger or producing a special disease. Yet it is true that this industry, when viewed generally, presents hazards for its workmen which are peculiarly terrifying and unnecessarily numerous. In some cases where these dangers exist the situation is as bad as the imagination of the most timid might portray. Workmen in these trades are still to-day too lightly exposed to danger, too carelessly supervised and hence far too often injured. Particularly is this true in those cases where the influences are insidious and noticeable only to persons who are keenly observant. One must be favorably situated for study of the workmen in these situations where occupational diseases come slowly but none the less surely. In many cases where such studies are made the ill effects on health are found to be indubitable. Manufacturers have been obedient to the labor laws; they have been humane in many cases without outside suggestion, and they have done much to produce hygienic surroundings in their works, but besides natural trade indifference and "point of view," customs and mis-

conceptions, no influences are still so powerful in retarding hygienic improvement as is the business barrier known as "unequal competition." Whatever of it may be involved in laws promoting factory hygiene, may yet be, and it is hoped will be, remedied by appeal to the unifying influences of Federal enactments.

It will be well, therefore, if we should enter into as much detail as possible in a report of this character, so that the general public might be informed as to where danger especially lies and where only ordinary conditions prevail; that it might also be placed in full possession of the facts regarding the situation of labor in the chemical trades, in order that there may be a fair outcome of any controversy over the subject when proposed laws are submitted to a hearing.

STATISTICS.

Classified statistics in the chemical industries upon which data could be obtained to expose the hygienic state of acid works are entirely wanting. Mortality from insidious causes cannot be traced, accidents are not all reported and investigations of reported cases are not made, and if made do not find their way into public printed records. This is a lack which I shall refer to again.

GENERAL CONDITIONS IN ACID WORKS.

The buildings are usually low and of framed timber construction. Independent brick piers and cast iron columns are much used for the support of separate apparatus of unusual weight. Floorings are therefore erected on quite different levels according to convenience and necessity, and gangways may be sloping or stairways may be varied in ways very puzzling to the chance visitor. This is responsible for many of the bodily accidents. Inspection by the Labor Department has been quite good and consistent in the past, yet it is almost impossible to go into any plant to-day without finding a situation where risks exist from half concealed openings, unguarded stairwells, slippery floors or some kind of trap of this character. Most plants are ground floor ones, however, even with no galleries, though at times exceedingly high. This is fortunate for the lessening of the above-

named risk and for providing ventilation, but it encourages too close a layout of machinery and the crowding of attendant operators. The supporting frame work for pipe lines, conduits, condensers and similar apparatus is apt to be insecure where there is no substantial flooring, and this is a situation producing dangers from leaks and fractures of the conduits and condensers. Vats of all dimensions, sunken or erected above the grade or floor, and tanks of many sizes and materials constitute the major bulk of what the visitor sees in a plant. If such receptacles for liquids are less than three feet above the floor they should be railed. At times such protecting barriers are found to be loose or rusted away or otherwise insecure.

Pumping lines, steam mains and pipes for various fluids run in puzzling confusion below ground, above ground and overhead; in fact entirely at convenience regardless of any attempt that might be made for running them in special ducts together or in more regular lines and planes. Whatever excuse economy offers for such of this irregularity none seems possible for a shiftless and common practice of leaving old disused lines of pipe or fittings to project and encumber flooring and gangways.

Furnaces in acid works and chemical plants are generally simple, low in form, braced by bolted plates and tie rods and constructed generally for hasty demolition and quick repair. Weakness under heavy loads is often found, and danger exists here. Careless stopping of discharge openings is another fault. Leaking roofs and bulging walls causing apertures for passage of dangerous gases are common.

A large amount of work is carried on in the shelter of the lean-to and the shed; particularly the manufacture of salts where the action of metals and minerals with the acids gives off offensive gases. Such work is not designed or intended to be carried on in very inclement weather, but it frequently is, and this introduces another ill to the workman, whose exposure will render him more sensitive to noxious vapors.

Lastly, a feature to be considered amongst the general ones is the matter of toilet facilities. So little has this been considered that it is unfortunately the rule to see in chemical plants only the faintest apology for water closets, usually inadequate in num-

ber, placed at the end of some distant walk in the open, scarcely protected even in winter weather; to see often no other washing facility than a broken valve or a fitting in a water line. It is quite common to find the men at noontime with lunch in hand seeking places in the sun or near the boiler or squatting on the very salt pile or ore heap that they have been shoveling as dusty material a few minutes before. It ought to need no medical officer to instruct a manager in the value of proper conveniences for aiding men to keep their health; but at any rate legal enforcement of these necessary improvements is now a certainty. It is equally a certainty that the employer will be as pleased with results as the employee.

If there are mysterious influences of gases and fumes in the chemical trades producing occupational diseases after a number of years of exposure by insidious and little recognized ways, there is much hope to believe that the observation of the ordinary principles of hygiene will introduce a bar to the development of some of these diseases. It is possible that the chemical trades will yet show a still healthier class of men than they do now, and workers who may remain all their working lives in the industry.

We shall now review the processes involved in the production of the most common of the acids in commercial use. We shall discuss the gases, liquids and salts involved in the operations, the agencies used for transformations, and shall consider the toxicity of substances involved and the insalubrity that may exist in each branch of the industry.

SULPHURIC ACID MANUFACTURE.

Besides being the most important chemical substance manufactured, sulphuric acid is the most interesting in its technical history; and presents some features of special hazard, which, to be reduced, must be well understood.

Three million five hundred thousand tons of it are manufactured in the United States annually. (Wedge, 8th Int. Cong. Appl. Chem., N. Y., 1912.) It is probable that only a very small proportion of this is actually manufactured in New York State, since 80% of the amount reported is used for the preparation of fertilizers, this being mostly in the South; and 10%, probably supplied entirely from New Jersey, is used for refining petroleum.

PROCESS.

When brimstone is burned in the air it unites with oxygen to make sulphuric dioxide, generally called sulphurous acid. This is a gas which is colourous and has a suffocating smell very familiar to those who have used sulphur matches. It is more than twice as heavy as air and extinguishes ordinary combustion. If this sulphur dioxide could be made to unite with more oxygen it would produce sulphur trioxide, also called anhydrous sulphuric acid.

Anhydrous sulphuric acid is a heavy liquid, which, below 58° Fahrenheit, solidifies into white needle-like crystals. It cannot exist in free air without taking up moisture. When this anhydrous sulphuric acid unites with water it becomes the best known acid of ancient or modern times, the Oil of Vitriol of the former and the Sulphuric Acid of the latter. The term Oil of Vitriol is still largely used, but applies usually to the acid obtained at a definitely established stage of its concentration, namely: 66° gravity, Baumé scale, 93.2% purity. Other names and grades are Chamber Acid (53°) and *Oleum* or Nordhausen acid. Some times this latter is called Fuming Acid. Its strength is very great and is usually represented by more than 100% because, in making it, anhydrous acid is dissolved in 97% acid.

This passage from sulphurous acid to sulphuric acid is usually accomplished by using certain oxides of nitrogen as intermediaries, or by passing the sulphurous acid over and through masses of asbestos, on the fibres of which there is distributed platinum in an infinitely fine state of division.

But sulphuric acid is not manufactured by the simple steps here indicated; rather by a long series of reactions difficult to produce except in special apparatus. Since in the *Chamber Process* the oxides of nitrogen play such an important part, and some of them are so often a source of danger, it becomes necessary to treat of them here.

Nitrate of soda is the raw material from which they are produced. When this is acted upon by sulphuric acid it is decomposed and yields sulphate of soda and nitric acid (HNO_3). There is obtained also a brown gas, peroxide of nitrogen (NO_2), which may also be expressed as N_2O_4 . Nitric acid is never produced

in air without some of this being formed. Two other oxides of nitrogen, also involved and very important in this process, are the nitric oxide (NO) and nitric trioxide (N_2O_3). In the presence of the oxygen of the air these are likely to unite further with it and form the red-brown oxide N_2O_4 . In all the operations we shall consider, all these gases, as far as toxicity goes, are taken to be alike, and are grouped under the terms, the Oxides of Nitrogen, and sometimes the "Nitrous Gases."

When nitric acid is decomposed in the air a mixture of these oxides is produced. Their poisonous characteristics and the similar properties of nitric acid will be dealt with later.

Now, in the lead chamber process of sulphuric acid manufacture, the hot sulphurous acid from the brimstone or pyrites burners (in the latter case cleaned from dust), is led by a large brick-lined pipe to the foot of a lead-lined tower packed with acid-proof brick. In passing up through this it meets with acid which has already been formed in the chambers and carries the "nitrous gases" and water, so that here some sulphurous acid is oxidized and then takes up water, forming oil of vitriol. From this tower they pass downward to the chambers entirely constructed of sheet lead supported upon heavy framing of timber. These are from 50 to 70 feet long and 30 feet wide, and usually about 24 feet high. Within these the union of the remainder of the sulphurous acid and oxygen takes place through the medium of the nitrous oxides and water vapor. The acid forms on the walls and runs down the sides. The exhausted fumes are carried through another absorption tower and are then discharged into a high chimney. The acid containing nitrous fumes goes back to the first tower to meet new lots of sulphurous acid. Thus the same lots of nitrous gases continue in use and the losses in the stack are reduced to a minimum. The sulphuric acid thus formed is called chamber acid, and has a strength of about 53° Baumé or 66.6% sulphuric acid. For the stronger grades concentration by heat is practiced. Sometimes this is done in lead pans over a furnace, and completed in platinum stills or in specially designed apparatus for treatment with hot gases.

With this description of the requirements of sulphuric acid manufacture a stranger to the industry may further imagine the

conditions in such a plant where the buildings are long and high and are simply framed up structures holding gigantic lead boxes, the so-called *Chambers*, with two or more towers, and how there are accessory furnaces for sulphur burning and acid concentration. Below the chambers there are usually good entries and passages. At times steps and platforms leading to the tops of chambers and towers are badly designed and ill erected.

Exposure to the acid itself is quite unlikely with such a closed-in system. It occurs, however, to a very serious degree on the occasions when the towers or chambers are opened for cleaning, as will be mentioned later. A place, also, where the workman may come into contact on a large scale with the corrosive acid, is where the filling of the carboys is done.

Sixty-six degrees acid is stored in steel tanks; lower degrees in lead. Filling of tanks, tank cars and very large drums is almost entirely free from danger, as the pumping is done by compressed air. Filling the smaller vessels — large bottles fixed in wood frames, and called carboys — is fraught with much danger. The glass breaks and the acid slops over workmen, or acid is left lying about upon the floor.

Sulphuric acid of 98% strength can be carried in steel tanks. For 75% and lower, lead-lined vessels are used. There is a danger in washing out steel tanks that dilute acid may act upon the metal and generate a gas, which, mixed with air, would explode if touched off. Also men could be asphyxiated by this gas in a partially closed place. If cast iron and sulphuric acid react on each other, and the former contains much phosphorus, the resulting gas can be very poisonous.

In the concentration of sulphuric acid, as required to make strong acid from chamber acid, there is much room for influences to arise which would be very injurious to the workmen. Improvement is constantly being made in concentrators, but there are still to be seen, even in this State, methods and apparatus which might well be replaced by less noxious ones. Such a method is the series of lead pans elevated by steps and placed above either the pyrites furnaces or the platinum still-heating furnaces. The danger of overflow, of failure of the pan bottoms and the general contamination of the air if certain conditions of density are not

observed, make this preliminary concentration in lead pans the least desirable method. Fused silica basins placed in the flues in cascade arrangement are used in England.

The higher concentration in platinum stills cannot be improved upon, except, of course, that it is very costly. Even with these, leaks can occur and the vaporization of anhydrous sulphuric acid can be very distressing. It is seldom that the air of the concentrating furnace room is not charged with this vapor to a degree very obnoxious to the chance visitor. The workmen, however, appear to be immune to it in the ordinary proportions. Complaint is not heard and they do not seem to be unhealthy. Statistics as to the health conditions of the men at this stage of the work are entirely wanting.

THE CONTACT PROCESS.

This process of manufacturing sulphuric acid differs from the Chamber Process in the simplicity of the reaction involved, and hence in apparatus, agencies and entire surrounding conditions.

There is nothing in the history of chemical engineering which is destined to produce such results of hygienic amelioration as is the invention by Winkler and Messel of the Contact Process. Winkler first pointed out how the passage of sulphurous acid gas through finely divided platinum resulted in a large proportionate yield of purest sulphuric acid. When the importance of this was fully appreciated, particularly in its valuable feature of elimination of nitric acid, and secondly of avoiding concentration, a process for its utilization on a large scale gradually developed until it is now seen in every country in the world, and for strong acid production is certainly triumphant.

The apparatus can be simply described as a series of boxes or a battery of tubes which are enclosed in one jacketed casing and in which the *contact-mass* (most often platinized asbestos) is packed and produces the reaction as the gas passes slowly through it under proper conditions of control of temperature, etc. There are conduits and boxes for material for filtering the gases and others for heating and cooling them, and pumps and receptacles for handling the liquid acid product, thus making the entire cycle of operations automatic. From the time the sulphurous acid is

produced in the furnace to the time the sulphuric acid flows out the reaction and the reacting substances can at no time be seen or felt. Cleaning is not frequent and is much simpler than the extremely laborious and dangerous work of opening and cleaning chambers and towers. The escape of nitrous gases is of course impossible for there are none; the escape of sulphurous acid and sulphuric acid vapors is so rare that in England works registered as non-chamber plants are not subject to statutory limit of escape of acid vapor such as that enforced in the lead chamber process, but are simply required to adopt the best practicable means for the prevention of any such escape. (Alkali Inspector's Reports, 1906.) The floor and the entire establishment can be kept very clear and well lighted.

DANGEROUS SUBSTANCES IN SULPHURIC ACID MANUFACTURE.

Returning to the consideration of the dangers in the acid works, we find that it can come from:

- (a) Sulphurous acid from roasters and brimstone burners, or anywhere on the line to the chambers;
- (b) Nitrous gases from the pots or from the nitric acid supply, or from the interior of the towers;
- (c) Sulphuric acid from the concentrators, or by fumes from this acid in the repair of chambers, or in the packaging of the acid, or indirectly by asphyxiation or explosion when this acid acts on metal in any enclosed place;

By this action also special danger can come from:

- (d) Sulphuretted hydrogen;
- (e) Arseniuretted hydrogen.

Sulphurous Acid:

This gas cannot be respired for long. It is an acute blood poison, but in an exposure to it one finds the choking so unpleasant in the very first moment that flight in self defense is the first thought. Lunge, page 154, quotes Ogata (Archiv. F. Hygiene, 1884, pp. 223). “.04% SO₂ causes difficulty in breathing after a few hours. He could not take a single full breath in

air containing .05% SO_2 ." The International Association for Labor Legislation, in the list of industrial poisons, gives the following for sulphurous acid: "In moderate concentration sulphurous acid is borne without inconvenience or injury; persons accustomed to the gas bear very well a proportion of 0.003 to 0.004 per cent of SO_2 in the air. Susceptible persons at the beginning of their employment in an atmosphere containing sulphurous acid, manifest a transient irritation of the mucous membrane of the respiratory organs and of the eyes. In its severe action there is spasmodic cough with secretion of tenacious, often blood-tinged mucus. The protracted effect of a high degree of concentration is livid discoloration of the mucous membrane, bronchial catarrh, croupous angina of the bronchi and their branches, and inflammatory areas in the lungs; disturbances of digestion." Lehman (Jsch. F. Agnew. CH. 1893, pp. 612) shows that persons not habituated to sulphurous acid are very little affected by .012 per thousand, but perceptibly so by .015 per thousand SO_2 —all persons by .030 per thousand after a few minutes causes strong irritation of the nasal passages, sneezing and slight coughing which sometimes decreases after ten minutes. The employees and workmen accustomed to it are but little affected by .037 per thousand." The sensibility to SO_2 seems to be lessened by habitually respiring air containing it. This is testified to by all who have experience with it. Rambousek, Gewerbliche Vertiftungen, page 221, says that sulphurous acid in simple concentration, from short exposure, can produce coughing and irritations in the mucous membrane of the nasal passages and of the eye; with longer exposure, inflammation of the mucous membrane, bronchial catarrh, bloody expectoration and inflammation of the lungs.

It will be seen, therefore, that unless it can be shown that exposure to sulphurous acid produces a progressive damage to the lungs resulting in making an occupational disease we need only concern ourselves with the danger of asphyxiation. No authority has spoken upon this subject and there are no medical data. The well known bactericidal effect of sulphurous acid inclines to the belief in its salutary influence in relief of diseases of such origin. Nevertheless, it seems to me that we should view

with concern any condition looking to a continuance or even often recurring irritation of the bronchial passages. It would seem as if weakness must ultimately develop. There are no statistics or information bearing directly upon this feature of the subject. But the figures of mortality of trades in England, reported by Oliver, may throw a light upon the subject. The chemical trades are not the worst, though high up in the list of ten; but when it comes to diseases of the respiratory system they are very high and second on the list. Wolff (Antl. Johnsb. d.m.d. Beufs. Fabr. betr. Beamtn. 1884) states, that in the case of the workmen engaged in the sulphuric acid factories mortality is the least in relation to other workmen. Yet certain characteristics occur to destroy health, as ailments of the respiratory organs. Lehman (Concordia 1906, Nos. 7 to 9) states, that the number of ailments of the respiratory organs in the case of the sulphuric acid industry is doubtless greater than in others, especially in respect to the laborers — those engaged in loading — those paid by the day, etc. He declares that this appearance of the severe choking and irritating effect of the sulphurous acid and sulphuric acid fumes on the mucous membrane of the windpipe lies in the fact that the escape of these gases is never entirely avoidable, because the draft of the furnaces in the chamber system undergoes fluctuation, and even the furnace passage is not always of the some proportion.

No person should enter a tank, chamber or closed place containing sulphurous acid, or work at a sulphurous acid conduit or any place in which there is danger of asphyxiation unless supplied with a suitable respirator and attended by a helper. In case of gassing the patient should be removed to the air, and, if in very bad condition, he should be treated by artificial respiration and oxygen. The Pulmotor is especially desirable for this. This is a mechanism, very compactly designed, in which a small steel bottle of oxygen under high pressure is used as both the supply of oxygen and as the motive power for driving the pumping mechanism by which the lung is inflated and deflated. It is extremely ingenious and perfect in its operation, and is rapidly making a high record of life saving.

Workmen themselves are immune to sulphurous acid so far as they may occasionally meet with it, and only an accidental case of overdosing gives them any concern. These seldom happen.

Besides the method mentioned of obtaining sulphurous acid, namely, by burning brimstone, there is also a very largely used method of roasting in furnaces a crushed mineral called iron pyrites, a sulphide of iron, which yields its sulphur for the production of the gas, which is purified from dust and sent to the chambers. This introduces in the acid works a furnace operation of much larger scale than the simple brimstone furnaces, and hence also permits the leaking into the air of much larger quantities of sulphurous acid through furnace door openings, cracks in walls, etc. In fact there are few places where the sulphurous odor is so strong as about these roasters. Nevertheless the workmen appear to be thoroughly inured to this amount.

Nitrous Gases:

The danger from the nitrous gases is a peculiar one. A very small exposure does not shock the victim or alarm him; yet many hours later he may be overwhelmed by the consequences. This is described by the International Labor Commission on Industrial Poisons in the following terms:

“Susceptibility to the effects of nitrous gases fluctuates considerably. Persons who suffer from the diseases of the respiratory organs are especially susceptible; not infrequently the continual inhalation of small quantities for many consecutive years even, occasions no serious disturbances of the health. A pale, sallow complexion and chronic bronchial catarrh may be deemed, nevertheless, the usual consequences of occupational inhalation of very moderate quantities of nitrous gases. Often however, large quantities of the poisonous gases are borne for hours together (6 to 8 hours) without discomfort; when suddenly after a long interval without disturbance, ominous symptoms appear.

“Symptoms of irritation in the air passages are manifest, as a feeling of constriction of the larynx, spasmodic cough, oppression of the chest, labored respiration, anxiety, cold perspiration on the face, protrusion of the eyes, gasping speech, paroxysms of

coughing, bluish discoloration of the countenance, coldness of the extremities.

“Consciousness is at first unimpaired, but with increasing difficulty of breathing it becomes dimmed; injury to the teeth. The urine is scanty, brown in color, containing haemoglobin and albumen. Death results from oedema of the lungs. In very severe cases methaemoglobin is observed, and then a general systemic poisoning may result.”

Examples of Cases:

The spilling of nitric acid upon wooden floors has often been productive of fatal results to the workmen from the fumes arising. One case, resulting fatally, came to the writer's attention in which the acid was spilled in large quantity on sawdust. The fumes were generated so suddenly and voluminously that the victim was overcome, and, though rescued, succumbed very soon after. In a situation like this, where one suddenly notices that he is surrounded by its vapor, he cannot too quickly seek the outside air, even if the only way to do so is to hold his head as far out of the window as possible. The most distressing cases, however, are those which, as often noticed in the description, the exposure appears to be light, but very severe after-effects appear even many hours later.

In the sulphuric acid manufacture the repacking of the Gay-Lussac towers, that is, the first tower in which the sulphuric acid arising meets the nitrous vitriol descending, has been the cause of accidents in great number. Lunge (pp. 588) refers to the great care which must be observed in this work. Rules have been laid down in Germany for it, the principal points of which are as follows:

Before repacking is commenced, the tower must be completely disconnected from the chambers, but the connection with the chimney must be left open. The tower must now be washed first with sulphuric acid, then with water or steam, until the liquid running off tests at most no more than 3° B'e. (1.022). During the taking out of the coke there must always be draught into the chimney. When unpacking from below the draught should act from the top; when unpacking from the top the draught should act from the bottom. If this cannot be done, the cover

must be removed and a large hole cut in the side at the bottom. Towers packed with coke must be unpacked from the side and from without, in case of tall towers on different levels. The packing material must be immediately removed. The workmen must be provided with mouth-sponges, respirating apparatus, india rubber gloves, etc. Before removing the mud collected at the bottom it must be stirred up from without with water, and this must be repeated if nitrous vapors are evolved. Men suffering from lung or heart disease should not be employed in this kind of work.

The English Alkali Report, No. 31, pp. 90, mentions a fatal accident which occurred in repacking a well-washed and unpacked Gay-Lussac tower, and which was evidently caused by the nitre gas retained by the old brick lining. It is therefore recommended to ventilate the towers in all cases from the top downwards during unpacking and repacking.

Special rules have been more recently officially laid down in Germany for repacking Gay-Lussac and Glover towers. (Chem. Ing. 1897, pp. 365.)

The "Chemical Trade Journal," published at Manchester, supplies posters for fixing up at chemical works, containing Rules for Dealing with Dangerous Gases, of which the following is an abstract:

No person may enter a boiler, tank, drain, vitriol chamber, or tower, except provided with a suitable respirator in good condition. If the gases cannot be absorbed, the men must be provided with a face piece supplied with air or oxygen. They must be secured round the waist by a rope, and a man must be in attendance to render assistance if necessary. If a man is "gassed," he must be speedily removed into the open air, and placed in a warm well-ventilated place. In bad cases an oxygen bottle and lung exercise must be employed. If the man is conscious, the valve is very slightly turned on and the oxygen introduced into his mouth, closing the lips around it and producing artificial respiration in the usual way; if the teeth are set, put the tube in one of the nostrils. The "lung exercise" (described in detail in the poster) is the same as that used in the case of accidents by drowning; it is not often necessary.

Other cases are reported by Lehman (Concordia, 1906, Nos. 7-9) where the lead chambers were entered for the cleaning of the floors and two of the men stirred up the acid fumes and stayed too long, resulting in their death. He recites a similar fatal case in the cleaning of the nitro-sulphuric acid pans in a sulphuric acid factory. The timely neutralization of the acid by chalk was neglected. Of the both workmen who stepped in the chamber, the one died the next day while the other remained well. The dead man had previously suffered from pleurisy. Another fatal case of handling nitrous gases is mentioned where a workman joining a ventilator to a lead chamber, with the aid of two other men, one of them breathed in too much nitrous vapor coming out of the chamber and he became ill and died the next day.

The Medical Inspector of Factories and Workshops in England reported in 1911 to the Chief Inspector the following cases of accidents from nitrous fumes:

| | | |
|-----------|----|--------------------|
| | 3 | in 1908 |
| | 12 | " 1909 |
| | 11 | " 1910 |
| | 18 | " 1911 |
| Of which, | 1 | " 1908 |
| | 2 | " 1909 |
| | 2 | " 1911 were fatal. |

In an article on "The Injurious Action of Several Gases and Vapors of Hygienic and Technical Importance," Pettenkofer and Lehmann (Akad. d. Wissensch, Munchen, 1887, pp. 179). (Chemiker Stg., 1910, pp. 1136) cite a case of a workman poisoned in handling a large bottle of concentrated nitric acid. He was transferring this by sucking upon the acid through sawdust. The contact of the acid and the fine sawdust caused large volumes of red fumes which he continued to inhale with the result that he was taken ill the same evening and died in an hour. The post-mortem examination showed that the lining of the lungs was injured. No examination of the blood was made.

(Chem. Ztg. Repert., pp. 390.) Two cases of poisoning occurred to workmen cleaning out a Gay-Lussac tower which had become exhausted. The men went into the tower in pairs, relieving each other every five minutes. Although they had satisfied

themselves that the tower was free from nitrous gas, it seemed that the stirring up of the sludge caused a reformation of the gases.

In the report on accidents in the German chemical industry, Chem. Ztg. Repert., 1910, pp. 290, out of 12,405 accidents in German chemical works 93 were caused by fumes. One of these accidents was in the nitro-cellulose bleaching room of a celluloid works, where, on the occasion of a serious fire, 20 firemen became ill as a result of breathing in injurious fumes, and three of these died. The fumes were probably nitrous gases.

Rambousek (p. 218) refers to the dangers of these gases and points out that in the case of long continued exposure to small doses there is a remote effect upon the blood, and besides recommending the use of oxygen he refers also to the mitigating effect of the symptoms when chloroform is administered principally for narcotic effect.

Sulphuric Acid:

The interesting features of danger from sulphuric acid itself are its poisonous character when taken internally, and its corrosive property on bodily tissues, skin, hide, and on textiles, as of course, also on metals. Only the latter feature, however, is important, for few have ever taken the acid internally and still fewer have ever succeeded in administering it to others. In former times it was on the poisoner's list of deadly substances, but was rarely used except where the victim was asleep or drunk. (Taylor, pp. 224.) This corrosive action of sulphuric acid is due to its most useful property, namely, its affinity for water. It will unite with the water molecule of organic substances and decompose them completely, and will even decompose others containing the elements of water and evolve a heat leading to the entire destruction of the substance. This explains its strength and baneful effect upon tissues and the skin.

It will unite with water in any situation, and in doing so in a large way generates so much heat that steam is formed; and if the conditions are right for a very sudden action an explosion can take place, throwing both acid and water about. The well known caution about mixing acid and water only by pouring the acid in a thin stream into the water, and not vice versa arises from

this; when the thin stream of acid meets the large volume of water the heat of the union is dissipated in the water; if the reverse took place steam would be formed, the acid could not take the heat away quick enough and the formation of steam would be a large volume.

By its internal administration Taylor (l. c.) says there is probably no case in which the sufferings of the individual before death are more intense. If the strong acid is swallowed the symptoms show at once burning pains in the throat and the stomach, followed later by vomiting. The only treatment possible would be the administration of magnesia and carbonate of soda in milk or water. Weak acid, if swallowed, would act with much less violence and could be neutralized by alkaline drinks or copious draughts of water, and washing out of the stomach. However, it is fortunate that accidents seldom happen in which we would witness the effects of strong sulphuric acid upon the internal organs.

The skin and the eyes of the workmen are the parts threatened, and such burns occur extremely often. In such events the first thing to recollect is that while water is a remedy it can do much harm at first by its heat of reaction. Sometimes a surplus of acid can be removed by a cloth before water is used, and copious volumes of water must then be employed to abstract the heat quickly. The first effect on the skin is a burning sensation, and if much acid is present the action continues with evolution of so much heat that pain becomes intense. There is a whitish discoloration of the skin, then brown, then red, with swelling of the surrounding tissues. In the case of extensive scalds there is ultimately decomposition of the blood, formation of ulcers of the duodenum, somnolence and even death. (International Association for Legislation — List of Industrial Poisons.)

Similarly in the eye, the corroding influences in the tissue of the cornea, after the water of the eyeball has been absorbed, can lead to most damaging effects. The antidotes and remedies are the use of water and alkaline washes, followed by the treatment always used after burns, such as covering with a mixture of linseed oil and lime water. Blisters should never be opened, and preventatives of blood poison should always be used where the skin is broken.

One of the effects of sulphuric acid projected in small fine particles into the air, as might occur in the concentration process, and its use in storage battery practice, as well as in silver refining, is the effect upon the teeth. Investigators of this Commission, working in Niagara Falls, have come upon many cases of this. Miss Potter gives two in Niagara Falls. Cases No. 43 and No. 44 describe an extremely bad condition of the teeth of workmen from the action of sulphuric acid fumes. Out of 27 men examined 25 showed extremely bad teeth, apparently eaten down or black with decay or entirely out. The report of the work people that their clothes wore out in a few weeks would seem to confirm the ascription of this evil to sulphuric acid fumes, for cotton is hydrolized by sulphuric acid and changes from a strong fibre to a discontinuous powder. I have seen workmen in sulphuric acid works whose teeth were very bad, and showed evidences of active decay. Whether this is due to the occupation no one certainly can say.

Quite important in the study of its continued influence on the workmen, tending to produce an occupational disease, is the experimental work of Weiske (H. Weiske, Jour. f. Landweiltsc., 1887, pp. 417), quoted by Blythe (Poisons, pp. 92). Weiske has experimentally proved that lambs, given for six months small doses of sulphuric acid, grow thin, and their bones, with the exception of their head, and the long bones are poor in lime salts; the muscles also are poor in the same constituents.

Sulphuretted Hydrogen:

Sulphuric acid is purified from traces of metals occurring with it, particularly arsenic, by means of the passage of sulphuretted hydrogen gas, so that the contaminating metal is precipitated as a sulphide. This has introduced much difficulty into the acid works and some cases of poisoning by sulphuretted hydrogen.

The Nichols Chemical Company of Long Island City report a very serious accident from sulphuretted hydrogen in this part of the plant, when several men were overcome, two of whom died immediately. Sulphuretted hydrogen is a very powerful poison.

It is a Hematic poison, reducing Haemoglobin, transforming the iron of this molecule into sulphide of iron.

According to admitted figures diluted in air even to 1/500, it makes air irrespirable for birds and in 1/250 for Mammalia.

In proportions of 1/140 it kills in about five (5) hours all the animals experimented on. (Lehman, Stizungsab. Akad. München 1887, pp. 179.)

“In the less violent cases there are gastric distress, nausea, fetid evacuations; irritation and inflammation of the conjunctiva; rarely, corrosion of the cornea, formation of vesicles on the lips, irritating cough, headache, and a sensation of giddiness. In long continued inhalation convulsions and paralysis occur.

In severe cases there are contraction of the pupils, slowing of the pulse, Cheyne-Stokes respiration, myasthenia, trismus and tetanus.

With a high proportion of sulphuretted hydrogen, in the air a man suddenly falls, becomes unconscious, and dies without convulsions (apoplectic form).

Chronic Poisoning:

Conjunctival catarrh, a sense of pressure in the head and on the chest, headache, debility, vertigo, nausea, disturbances of digestion; sallow complexion and emaciation, slowing of the pulse; tendency to the formation of boils.” (List of Industrial Poisons, International Labor Legislation Committee.)

Men should not be carelessly ordered into places of danger where this gas is apt to be found even in the smallest proportions. Safety ropes in certain situations should be used on men; means for artificial respiration should be at hand, particularly the “Pulmotor” or an oxygen tank. Hypodermics, together with ether or camphor, are recommended.

In the report for 1911 of the Medical Inspector to the Chief Inspector of Factories and Workshops in England, he shows the cases of poisoning from Sulphuretted Hydrogen as follows:

| | |
|-----------|----------------------|
| | 8 in 1908 |
| | 5 “ 1909 |
| | 2 “ 1910 |
| | 8 “ 1911 |
| Of these, | 1 “ 1908 |
| | 2 “ 1909 |
| | 2 “ 1911 were fatal. |

Arseniuretted Hydrogen:

An extraordinarily small amount of this gas can cause poisoning. Whenever hydrogen is formed by the action of sulphuric acid on a metal or a liquid substance containing arsenic, the gas is contaminated with Arsine, which is Arseniuretted Hydrogen. It is the gas of the garlic-like odor which accompanies the gas for balloonists obtained by acting on metal turnings. Oliver, pp. 750, gives two examples of poisoning by it in military ballooning. The symptoms of poisoning are vomiting, faintness, cyanosis and impaired respiration. Watts (Dictionary of Chemistry) says it is excessively poisonous — in working with this gas it is impossible to be too careful — more than one chemist has been killed, for example, Gehlen in 1815. Taylor, pp. 397, says, no treatment can save life when it has once respired. This is true only of the particular substance. It acts upon the red blood corpuscles and dissolves them (Hemolysis). It is therefore a strong blood poison.

This danger of course must be recognized as only likely to happen in the industry we are considering when an impure iron or metal containing traces of arsenic is acted upon by sulphuric acid and gives off the gas wherein the Arsine would exist in proportions strong enough to set up some of these symptoms.

Lastly, we must recollect that from the same cause — the generation of gas — situations can arise where a mixture of hydrogen gas and air can exist in a closed space and constitute a great menace from the risk of explosion. A good manager will look out for this and either prevent its occurrence or be diligent in ventilating such places where it has occurred.

NITRIC ACID MANUFACTURE.

As stated before, Nitric Acid is manufactured by the action of sulphuric acid upon nitrate of soda. This is accomplished in large iron covered vessels placed over the fireplace in a brick furnace and entirely surrounded by fire brick. The gases are led through earthenware pipes to absorbing vessels of earthenware and condensing apparatus of glass or earthenware. Leakage of the joints of this apparatus are the chief sources of danger. The gases escaping into the air would be the nitrous gases already

familiar to us in the similar situations in the sulphuric acid manufacture. It is proposed, and is much in vogue, to keep the generating and condensing system under a vacuum, by which means leakage is avoided. The charging and discharging of the retorts has some elements of difficulty and danger to the workmen. The nitric acid itself is obtained in varying strengths from 56.6% to 91.4%. It is proposed (German Patent 249328 and 249329) to manufacture a highly concentrated acid and to use compressed oxygen, performing the operation in pressure vessels. If this should be commercially successful, it will also introduce a new danger, although perhaps most of the hygienic difficulties and dangers might be surmounted. The proposal however indicates the entrance into chemical technology of new forces, and accentuates the necessity of providing means of reaching new conditions of danger without appealing to Legislatures repeatedly.

Nitric Acid is not as important a branch of manufacture in our State as it is in our neighboring States and in the West. This is because it is so largely used in the manufacture of explosives, and this latter industry is so much more developed elsewhere. A very large additional quantity of mixed acids is also manufactured in New Jersey for the "Dipping Trade."

Nitric acid has a very strong corroding action upon some substances. Metals decompose it with the generation of "nitrous fumes," and organic substances are changed by uniting with a part of the nitric acid molecule. As an industrial poison it is treated by the International Labor Legislation Association as being in the same class with nitrous gases.

Aqua fortis, as it has always been denominated in Pharmacy, has in past times often been used for suicidal and murderous purposes; but as with Oil of Vitriol, internal administration of large doses is unusual and unlikely. It is strongly corrosive alike of mucous membrane and of cuticle.

"DIPPING" METALS.

A process of enormous application for cleaning and ornamenting small metal articles is that known as "dipping." It involves the use of nitric acid. A dipping acid is frequently a mixture of strong nitric acid with one-quarter or one-third of dilute sulphuric acid. Sometimes the dipping acid is compounded with other

chemicals, as in one case with sulphate of zinc. The process consists in securing the metal articles upon wires and immersing the bundle below the surface of the acid; action is rapid and some red fumes come off; but in a moment or two when the workman brings them back into the air preparatory to re-immersing them in water, a dense and voluminous cloud of the red fumes is created. At this moment the danger is excessive. Even when the work is done in the open or in any strong draft the contamination of the workman's breathable air to a dangerous degree is almost unavoidable. In large shops, wood ventilating ducts under forced draft overhang the dipping crocks with apertures properly spaced. One difficulty, however, lies in the fact that to facilitate the handling the duct is made not to overhang the crock too much. Some escape therefore takes place.

I look upon this trade as the most dangerous known to the chemist, far transcending the dangers of nitric acid manufacture itself. It is a field in which too much effort at amelioration could not be expended. It is astonishing to see the ignorance in some shops of the danger of these gases. The dippers are fallow in complexion, show loss of weight, red eyes and brittle teeth.

HYDROCHLORIC ACID MANUFACTURE.

Hydrochloric acid is the weakest of the common mineral acids. It is used for the conversion of starch in the glucose manufacture. It is also used in general chemical practice as a useful reagent to produce very soluble salts, and it is used in pickling metals. In the action upon gold or platinum to obtain the chlorides, it is used with nitric acid to make the strongly reacting mixture known as aqua regia. In England, where the Leblanc process is used, Hydrochloric Acid is a byproduct. In this country it is made for itself and the scale is not extra large. The chief manufacturing process results from the action of the Sulphuric Acid upon common salt; this also being carried out in an iron vessel over a fire and connecting with a species of muffle into which the heated charge can be raked and the last portions of acid vapor driven off. The vapor is passed through stoneware enclosures to towers through which it passes upwards to meet water dropping down through coke or clayware; the resulting solution is hydrochloric acid. It is obtained in strengths varying up to 37% of pure

Hydrochloric Acid in water. Saturated aqueous hydrochloric acid would contain 43%.

It can be manufactured also direct through the union of chlorine and hydrogen gases. This is a method now in use in Niagara Falls incidental to the manufacture of caustic potash by electrolysis. It will probably become an important method of manufacture in this country since the product is almost absolutely free from arsenic and other impurities. One of the dangers in the manufacture by the first method is the annoying fumes which come from the hot salt cake when it is drawn from the furnace. I have known cases also of this being drawn too rapidly by the workmen and falling upon and burning them. Hoods are in use as reported by the Chief Inspector of Alkali works in England, 1911, for drawing off the vapors at this point. In the same report it is suggested that the idea, which has proved quite successful, might be applied elsewhere with advantage, and much fume also be avoided in the operation by immediately covering the hot material with a little cold salt cake.

The best treatise upon Hydrochloric Acid in its factory hygiene relations can be found in Oliver, from whom I quote:

“The hydrochloric acid gas has a suffocating and irritating effect when breathed, and if present in any considerable quantities in the air, makes it quite impossible for anyone to stand the suffocation and irritation produced. Even in smaller quantities the irritation of the air-passages is so great that it must in the course of time prove injurious to the workmen. If we could obtain an ideal system, there seems to be no reason why workmen should be exposed at all to this irritating gas. The furnaces are, of course, arched in, and the gas is drawn off as it is generated. The main danger of the exposure to the gas comes when the workman rakes the salt cake from the furnace into barrows, for removal to the next operation. Here a considerable improvement has been made of late years. The salt cake is raked into an iron box, which is connected to the furnace draught, so that the gases are drawn away while the salt cake cools, and the box is not removed from this position until by this means most of the fumes of the acid have been given off.

(See 1911 report. Alkali Inspector.)

Notwithstanding these improvements, hydrochloric acid gas is found to be present more or less in the neighborhood of these furnaces. The state of repair in the furnaces themselves, the condition of the weather, the amount of moisture in the air, the successful working of the acid towers, the rate at which the workman is trying to get out his material, and consequently not allowing it to cool properly in the iron box — all these conditions are present, and any of them may result in the presence of a certain amount of gas. It is only necessary to be in a town like St. Helens on a moist evening to realize the fact that from these various chemical works large quantities of hydrochloric acid and other gases are evidently escaping.

In order to protect himself to a certain extent from the hydrochloric acid, the workman either wears a flannel muffler tied over his face or he bites a piece of flannel between his teeth and breathes through it. The fumes of acid quickly cause the teeth to rot away, and it has been suggested that this biting of the flannel, which gets full of acid, is one of the main causes for the rotting of the teeth. I have no evidence, however, on this point. My impression is that the rotting of the teeth will take place whether the flannel is held between the teeth or wrapped over the mouth. Besides being exposed more or less to hydrochloric acid gas, the man is also working before a furnace door, in an open shed, and his work is of a very heavy character, so that he usually wears a minimum of clothes and perspires freely. He is thus exposed to constant chills, and to the risk of developing some pulmonary disease."

But Hydrochloric Acid is not handled on such a scale as this in this country and is seldom so serious a danger. Its easy solubility without marked heat in the fluids of the mouth and stomach reduce its corrosive properties to the minimum. Naturally, however, a large dose of the strongest grade could destroy the stomach lining to a degree to destroy life (Taylor, pp. 268). Information, again, as to whether the gas or acid is, by chronic exposure, productive of an occupational disease is wanting.

ACETIC ACID.

Acetic Acid is an organic acid, most familiar in its dilute form as obtained from weak wines and fermented fruit juices.

In such substances, known as vinegars, the acid is never over 4.5%. Acetic Acid is obtained in the destructive distillation of wood, in which process it is neutralized with lime, and this in turn is acted upon by sulphuric acid and yields an Acetic Acid of about 30% strength. Such an acid is strongly astringent but not actually corrosive. Mild alkalis will neutralize it without much heat. It is not mentioned in the International Labor Association list of Industrial Poisons.

Glacial Acetic Acid is a variety which is very concentrated, and is obtained by distilling acetate of lime with strong sulphuric acid. This is done in copper vessels. There is very little danger, but if the distilling or condensing apparatus breaks, strongly caustic fumes arise. Good ventilation would prevent danger from this. Hard rubber piping is much used.

It is peculiar in that more discomfort arises in the manufacture of spirit vinegar than in the manufacture of even the strongest acetic acid. This is on account of some peculiarities of the process, and particularly by reason of the extent of the manufacture, which is very great. One vinegar factory in New York city, just about to remove to larger and better ventilated buildings, has employed in a small loft building as many as 700 generators, each about 10 feet high and 3 feet in diameter. From the tops of these the constant escape of harsh vapors of mixed origin, combined with the accumulated heat from the reaction, brings about a very suffocating atmosphere. These vapors contain principally an ether and an aldehyde, congeners of acetic acid.

The International Committee gives the following as the symptoms of poisoning by acet-aldehyde in vinegar manufacture:—Irritation of mucous membranes of the nose, larynx and bronchi; irritation of the mucous membrane of the eye; exhilaration of the heart's action; profuse night sweats.

Brannt (Vinegar, Phila., 1900, pp. 27) says, "pure acetic acid (glacial) is a powerful restorative when applied to the nostrils in impending fainting. It is the strongest of organic acids and nearly as corrosive as sulphuric acid. Applied to the human skin it acts as an irritant, causing redness and swelling, followed by paleness of the part, and if its application be overlooked it is followed by vesication and desquamation of the cuticle. It

first whitens mucous membranes, then turns them brown, causing meanwhile a severe burning pain." It is used in pharmacy for decomposing cuticular tissue, removing warts, etc.

HYDROFLUORIC ACID.

Hydrofluoric Acid is a valuable acid in the removal of silica in the ornamentation of glass, and in foundry practice, but is not a material of very great importance. I only know of one manufacturer of it in this State, but perhaps there are two or three. It results from the action of sulphuric acid on fluoride of lime, and the action is brought about in large semi-circular retorts of about 4 feet in diameter and 7 feet long, surrounded by brickwork, over a fire. The tube leading from the top of the retort is carried directly through simple condensing apparatus to the receiving vessels. These must be lead, as this acid cannot be held in clay or glassware. At ordinary atmospheric pressure evaporation takes place freely. The liquid is extremely corrosive upon the skin and produces long lasting sores which extend sometimes to the bone. The gas also has an irritant effect upon the lungs.

The International Committee on Industrial Poisons recommends Intense irritation of the eyelids and conjunctivitis, coryza, bronchial catarrh, with spasmodic cough; ulcerations of the nostrils, gums and oral mucous membrane; painful ulcerations of the cuticle; erosions and formation of vesicles; suppuration of the finger nails.

One factory superintendent has reported to the writer that he has seen many cases where its regular use for dipping iron castings produced decay of teeth and of finger nails and bad sores on the hands and arms. It was customary in this foundry for the men to be careless in handling the Hydrofluoric Acid, but to plunge their arms into milk of lime for the neutralization of it.

HYDROCYANIC ACID.

This acid, sometimes called Prussic Acid, can hardly be called a commercial acid, but as it is largely availed of by nurserymen and fruit-growers it should not be passed over without mention. It is perhaps the deadliest gas known. It is obtained when another acid reacts upon potassium or sodium cyanide.

In nurseries it is the custom to place bundles of plants in a large closet or case made tight when the door is closed, and having provided a dish of acid in one corner, which might be reached through a small trap door, to throw the cyanide through this opening and let the trap drop. None but an examined and licensed workman should be allowed to practice such a process as this, or even to obtain the cyanide. Accidents from the unexpected evolution of this gas from cyanide occur at times in laboratories, plating works, assay rooms, etc.

The International Committee give the following symptoms:— the following special measures of relief:— Fresh air; artificial respiration; administration of oxygen; cold affusions and friction; hypodermic injection of either, camphor; if the poison has been taken into the stomach, give emetics, then immediately rinse out the viscus with water, with the addition of one-quarter to one-half of 1% of potassium permanganate. Kobert recommends a 3% solution of hydrogen binocide for subcutaneous injection, in doses of one cubic centimeter, at different points in the body. But on the other hand (hydrogen peroxide) H_2O_2 is deemed unsuitable, and an alkaline solution of ferric sulphate, or an antidote for arsenic with some ferric salt, is indicated as the best remedy. To control the convulsions give morphia hypodermically.

GENERAL REMARKS.

Night Work:

Night work is seldom a source of danger in acid works, as during the night the operations are curtailed as much as possible and only those carried on, such as furnace work and care of condensers, reservoirs, etc., which call for attendance of labor. Almost always unloading of raw material, packing and shipment of finished product are avoided at night. Repair work should also be avoided but is not always, and is provocative of much danger.

Protection from Gases:

The question often arises: Shall we carry on operations apt to result in gas leaks in closed rooms under forced ventilation, or in large covered spaces with free movement of air out-doors through large doorways and through roof openings?

This would have to be answered according to the toxicity of the gas and the volume regularly produced; neither feature alone will decide. Thus, in handling hydrocyanic gas, there can be no question of permitting any to escape. The system would have to be absolutely closed and terminate in an absorption apparatus. In cases of other gases less poisonous and seldom unmixed with air, the answer would be, if the escape is in small volume, keep the apparatus in a large room provided with constant good draft from louver ventilators and large side wall openings. If the escape of poisonous gas is apt to fluctuate and become suddenly considerable, the location of apparatus should never be in confined quarters and the surroundings should never be dark or encumbered inasmuch as a workman who may have been overcome and have fallen may not be seen.

A case in point occurred in a factory at Niagara Falls where sulphuretted hydrogen is used on a large scale. The generating apparatus for this gas was once located in a small closed room. A serious leakage occurring caused a change in this plant although it was not learned that any serious case of poisoning or accident occurred. But the generating plant is now located at an open corner of a very large open high-roofed building.

Protection from Dusts:

Dusty occupations are numerous because so many substances must be pulverized to promote perfection of treatment, as pyrites to be burned or salts to be dissolved, or the finished article must be pulverized and barreled for shipment. The result introduces the most embarrassing situation and the one most usually met with.

Relief for the workman can seldom be fully obtained by any resource, and hence we have all the evils that follow the exposure of the lungs to anything in the nature of dust no matter how neutral in general properties. Respirators are the best devices to avail of; ventilation by power in many cases is successful and vacuum cleaning, even flushing with water the surfaces which gather dust all lead to improvement and more favorable conditions.

SUGGESTED LEGAL ENACTMENTS FOR WORKMEN'S PROTECTION.

Legislative enactments intended to provide the fullest industrial protection in such trades as these should be drawn up with a

recognition of the fact that these trades are constantly changing, that long settled practices are being abrogated and new processes, new substances and changed conditions are constantly coming into technology. It is thus that our complex civilization registers its demands for new supplies regardless of the dangers in their production and use. It is therefore evident that our State Legislature can hardly be expected to take up and test out each session the new problems of the year in the hygienic control of such factories.

Rather let the Legislature pass only such enactments as legalize the executive control, define its limits of power, create its embodiment, set forth the best general code of laws capable of giving it full general control in the present state of the arts and endow the Commission thus created by its will with powers for adjusting the conditions by means of rules having the force of laws; these rules when promulgated to receive the approval of the Governor, and naturally also to be subject to review by the Legislature. The laws should be general, the rules specific. A factory code would thus develop to cover every possible kind of equipment and surroundings and every possible substance or condition of use.

An advisory board of engineers could be placed at the command of the department or commission-head as an aid to reaching certainty and fairness in the applications and enforcements of the law and rules.

THE ELEMENTS OF THE PROBLEM IN THE ACID TRADES.

The chemical trades differ from the others in hygienic conditions only in the fact that poisons and corrosive substances are surrounding the workmen in larger quantity or more frequently. It is quite possible, however, to have a situation where the risks in manufacture are very much less than in use. This is nearly always the case with nitric acid, as has been pointed out. In its manufacture the reactions, the operations and the plant are simple and fairly well guarded. Unless a serious and real accident happens the corrosive gases are always in confinement and the liquid is securely placed in containers without exposure to the workmen. When put into use, however, nitric acid decomposes with the easy generation of nitrous fumes and nearly always in situations and conditions where the vapors can reach the workmen.

As I have already pointed out, there is little about an acid plant, as ordinarily found, to impress one with the elements of bodily danger. It is seldom a large erection like steel works. Tanks, pipes, boilers and furnaces seem to be the most evident apparatus, and these seldom compare in size in installation with similar apparatus, in, for example, a sugar house or a brewery. Encumbered areas, slippery floors and galleries, ill lighted passages and badly ventilated sheds make up most often the sources of danger, and this last is the greater because of furnace fumes, mill dust or corrosive gases leaking about. Acid burns, asphyxiation, and scalds are the forms which casualties take. Lung affections, eye sores, skin sores and blood poisoning are some of the ills which may be found resulting from continued work in some of these special industries.

If therefore your Honorable Commission would like advice or suggestion as to what form legislative bills should take to correct present evils in the chemical and acid industry, I would recommend:

First. General legislation empowering the Commissioner of Labor to take cognizance and control of chemical and technical establishments.

Second. Specific rules governing the conduct of employer and workman in hazardous trades.

Third. I suggest defining;

- (a) Hazardous trades.
- (b) Industrial poisons and constructive poisons.
- (c) Character and proportionality of dusts, gases, fumes and vapors, which must be considered dangerous.
- (d) Hazardous articles in manufacture or utilization.

Fourth. I recommend both general and specific rescripts concerning:

- (a) Adequate ventilation.
- (b) Fume removal.
- (c) Heat protection.

- (d) Protection at furnaces and zones of high heat.
- (e) Protection at vats and kettles.
- (f) Ready provision of remedies, aids and apparatus for relief.

Fifth. I recommend that such provisions and others should be provided for each occupation when it is necessary to treat of it separately and in a class by itself.

Sixth. I recommend that in trades made dangerous to health by grit or damaging dusts, and where removers, respirators and such devices are not used or are inadequate under the conditions found, and the conditions cannot fairly be improved upon that men be not employed till after medical examination, and that such examination be repeated quarterly in the year, and that the certificates be filed amongst the office records of the company or individual owning or operating the factory.

Seventh. I recommend that it be provided that in any dangerous duty calling for the exercise of skill, and where the absence of skill may threaten the safety of a workman or his fellows, no workman shall be put regularly at the task by himself until he has been trained to efficiency and a certificate of this efficiency has been signed by the superintendent and filed under its proper date in the office records of the company or individual owning or operating the factory.

The purpose of the above provision is while avoiding too much official supervision, yet to put the superintendent in every plant on record as certifying that he has looked into the workman's efficiency. While such certificates could be tampered with it is well to leave the certification as simple as possible, and if such a system is working it is probable that in most cases the factory history would develop as to whether such records had been kept in a way to avoid incrimination of a superintendent. The stamping of labor inspectors' posters by dating stamps is an instance in point.

Eighth. I recommend that where hazard exists and skill and familiarity with a situation is needed, no ordinary workman shall be allowed to fill another's place and the machine or operation must remain shut down till skilled labor is at hand.

Ninth. I recommend that when suffocating gases escape with frequency, and the free movement is not sufficient to reduce the resulting contamination to a safe degree, hoods and power ventilators must be so provided that working space shall be sufficiently free from fumes to permit workmen to carry on their duties.

Tenth. I recommend that where a combination of unusual heat and suffocating fumes is liable to occur, special precautions must always be taken, and no workman must be allowed to go without accompanying aid into a situation thus existing to a dangerous degree.

Eleventh. I recommend that where poisonous or irritating salts or combustible substances accumulate as fine dust on beams, rafters and projections causing risks to health or danger of explosion, a clean-up must be made with sufficient frequency, and by the use of hose or other means this particular danger must be removed.

Twelfth. I recommend that in all rooms where acid burns are liable to happen and water in large quantities is the first requisite, a large tub should be kept full of water with buckets also at hand, the tub being securely covered, yet accessible, and above it and in good working order a large supply pipe with water on and tapped by a large valve; that solutions of soda or bicarbonate of soda and supplies of olive oil and lime water should always be kept close at hand, preferably in easily opened cabinets fastened to wall or column.

Thirteenth. I recommend that each risk according to the shop work or to the substance involved, must have its preventive and palliative conditions rehearsed often to the men, and these drills must not be allowed to lapse into neglect because of freedom for a time from accidents.

RECOMMENDATIONS FOR EXECUTIVE ACTION.

Collection of statistics of the chemical trades, particularly of the acid manufacture and of the health conditions of the workmen should be inaugurated. These should show data of value as for instance:

- (a) Number of chemical works registered in the State.
- (b) Number of acid works registered in the State.

- (c) Quantity of each acid manufactured.
- (d) Number of accidents each month.
- (e) Number of deaths each month.
- (f) Number of days of absence of workmen on report of ill health.
- (g) Average length of service of workmen in the given trade.

Above all I recommend as the most important work of an illuminating character to be inaugurated, the determination of standards of permissible contamination, leading to the ultimate rigid protection of the atmosphere in workshops from corrosive or poisonous acid gases.

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1899, p. 124

1901, p. 54

1909, p. 81

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1895, pp. 106; 122; 136

1896, p. 81

1897, p. 114

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1901, p. 54

1903, pp. 67; 433

1906, pp. 200; 375

1907, p. 100

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APPENDIX VIII

AN INVESTIGATION AS TO THE DANGER OF POISON- ING FROM LEAD AND ARSENIC IN INDUSTRIES LOCATED OUTSIDE OF GREATER NEW YORK.

BY

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AND

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PREFACE

HON. JOHN WILLIAMS,
Commissioner of Labor,
Albany, N. Y.

SIR.— Upon request of the State Factory Investigation Commission an investigation was undertaken as to the danger of lead and arsenic poisoning in industries located outside of Greater New York City.

It was the aim of the present investigation to determine where the danger point in the industry, or process of manufacture was, how it could be eliminated or guarded, and the health of the worker protected; also, the relationship of the worker and the industry to the question of poisoning.

This necessitated not only an inspection and examination of the industry and various processes of manufacture, a chemical analyses of the ingredients and raw material used, and the atmospheric conditions under which the work was carried on, but also a physical examination of the workers. The latter undertaking presented difficulties, as a proper and complete physical examination requires considerable time, and in many cases the workers declined to undergo the ordeal, therefore this portion of the investigation was limited to inquiries, a superficial physical examination, and in some cases estimation of haemoglobin and urine analysis.

Together with Factory Inspector John H. Vogt, to whom was entrusted the supervision of the analytical work, visits were made to factories wherein lead and arsenic or their compounds were used, or reputed to be used.

In view of the short time allotted for the work, it was an impossibility to cover every industry, or even every factory of a particular industry, so as to make the investigation a complete one, but an effort was made to cover at least one or more factories in each industry and so make the investigation an intensive one.

During the course of the work it was found that in many industries modern methods and recent chemical advances had pro-

vided harmless substitutes for the more dangerous ingredients formerly used, but nevertheless, analyses of conditions were made as confirmatory records.

The lack of reliable morbidity, and even mortality statistics, makes the compilation of comparative data a difficult task, and as there is, in many instances, a vast difference between the processes of manufacture, and ingredients used in industries in this State, as compared with the same processes and industries in foreign countries, especially Great Britain, the splendid statistics gathered by the authorities abroad, are not, in all cases, applicable for comparative data.

Most important factors are personal hygiene and housing conditions, but these questions the Department was unable to take up; it was understood that the Commission would endeavor to study these problems.

It will be readily seen then that the conclusions arrived at are based upon actual facts so far as the industries are concerned, and upon observed conditions of the employees while at work or about the factories. The task of definitely placing the burden of responsibility is a difficult one, but in so far as the processes of manufacture are concerned the work was lightened. By means of physical and chemical determination, the exact cause, and the definite danger point have been determined, and definite as well as practical safeguards have been recommended.

The results of the investigation are by no means final, and it is intended to pursue further investigation as to the industries' part in the question, as well as undertake research work as to the effect upon the human economy, so that if possible, the danger of poisoning may be entirely eliminated.

That the report may be comprehensive, the general discussion has not been confined to our findings in the industries visited, but includes historical, chemical, and toxicological references. In the preparation of the report, numerous works of reference have been consulted, and as is often the case, specific mention may have been inadvertently omitted, a bibliography has therefore been appended. While not as complete as could be wished for, it is hoped that the list of references may be of aid to those engaged in further research. Through the courtesy of the Board of Directors,

there was placed at our disposal, the use of the laboratory of St. Bartholomew's Clinic. Through the kindness of President Rush Rhees, and Prof. Victor Chambers of the Rochester University, we were favored to have the use of a small research laboratory in the chemistry building of the university. The enjoyment of these privileges where analytical work could be performed to a completion was of inestimable value and aid in completing the investigation.

The investigation was not merely confined to analyses of atmospheric conditions, but analyses were made of urine, gloves, clothing, materials used in various processes of manufacture, water in which the workers had previously washed their hands, towels, dust, and floor sweepings.

LEAD POISONING.

Lead is a metal which has been known from the earliest times. It is mentioned in Job xix, 24. It was used by the Romans to make water pipes which were soldered by lead and tin, and articles made from it bearing Roman inscriptions and dates are still preserved. Pliny mentions the metal as "plumbum nigrum" and "plumbum album," and uses the word minium in its present sense of red lead. Dioscorides described a substance "molubdania," which was undoubtedly litharge. The white lead of the present day was well known to Guber in the eighth century, and lead salts, red lead and litharge (both oxides of lead) were known to the alchemists, who designated lead by the sign of Saturn ♄. Small weights of lead have been found among Viking remains dating as early as the tenth century.

The earliest discovery of lead on the American Continent is recorded fourteen years after the landing of the first English settlers in Virginia. In 1621 lead was found in the vicinity of Jamestown near Falling Creek. The increased demand for bullets by the settlers furthered the search for the metal. The French settlers also induced the Indians to hunt for the metal, for which they in turn gave them trinkets and even firearms. Some time elapsed before, by accident, it was found that the Indians living in the vicinity of Wisconsin and Iowa were busily engaged in making the metal from ore. They readily reduced the metal

from the ore by building fires over masses of the ore and digging small trenches away from the fire into which the metal could run. Thus was the beginning of the lead industry, the field of which has reached such enormous proportions.

On account of the many uses to which lead can be put in the arts, and its wide distribution over the earth, large quantities are mined in many countries in Europe, South America, Asia, and North America. Native lead is of rare occurrence, found in but few places, and then only in a laminated form. The metal is chiefly obtained from the minerals galenite, cerussite, and anglesite. Until recent years the metal was obtained from no other source than from the mineral galenite which contains approximately 86.6% lead, and 13.4% sulphur. Large deposits of galean or galenite are found in Great Britain, Germany, Spain, Norway, Turkey, France, Isle of Man, Scotland, Wales and the United States. The Colorado smelting works which came into importance in 1878, yielded in 1887, 70,000 tons of the metal. The works and mines are located at Leadville where much of the ore occurs as cerussite, a native carbonate of lead. Idaho, Utah, Missouri, New Mexico, Oklahoma, Pennsylvania, and Montana are also large producers of lead. According to "The Mineral Industry" by Charles, published in 1911, no new mines were discovered since 1910. The amount of crude lead production in the United States during 1911 amounted to 400,988 tons as compared to the production in 1910 of 392,704 tons.

In New York State, lead is found in the form of galenite at Rossie, St. Lawrence County in gneiss, the vein being three to four feet wide. It is found near Wurtsboro, Sullivan County, associated with pyrite. At Ossining-on-the-Hudson, cerussite is found with some galenite (galena). At Otisville, Orange County, where in 1910 some prospecting was done at the Phoenix lead-zinc mine, a vein was reported at 350 feet from the tunnel mouth, the vein being drifted upon for 200 feet. At Macomb, St. Lawrence County, where galenite (galena) associated with blend and almost pure calceiteis was found, a 20-ton concentrating mill had been in operation up to 1911. Lead is found in millstone grit in a large vein at Ancram, Columbia County. These localities are at present producing no metal whatever. It is probable that

the workings cannot be successfully carried on with any profit due to the remoteness from railroads, and the low grade of the ore.

CHEMISTRY.

Lead (Plumbum) is a bluish white, soft metal, having a bright metallic lustre when freshly cut or melted. It is readily oxidized when exposed to the air, but suffers very little loss when compared with other metals. It can be readily scratched with the human nail, easily cut with a knife, and makes a streak on paper. On account of its softness it can be readily rolled into sheets when cold, and its low melting point, 663° F.- 334° C., makes it a decidedly useful metal for casting type, pipe, ornaments, etc.

There are two oxides necessary to notice.

Litharge or lead oxide, contains 92.82% of lead. It is either in crystalline scales, a fused mass, or a powder, varying in color from yellow to reddish yellow or orange, and when prepared below the melting point is called "massicot."

Minium or red lead is a compound of protoxide of lead with the dioxide. It is of a brilliant red color.

Sulphate of lead contains 73.61% lead, when produced artificially is a heavy white powder insoluble to a great extent in water. The sulphate can be readily changed into the carbonate by boiling it with solutions of the alkaline carbonates. The sulphate, fused with cyanide of potassium, yields metallic lead.

Acetate of lead, sugar of lead, is found commercially in white spongy masses composed of acicular crystals. It may also be found in flat four-sided prisms. It has a sweet metallic taste and is soluble in water.

Chloride of lead contains 74.48% of lead and is in the form of brilliant crystalline needles.

Carbonate of lead, white lead, is composed of a mixture of neutralcarbonate of lead and hydrate of lead.

As a pigment we have chromate of lead and a bichromate of lead.

Before entering upon the analytical work where it was known that very small amounts of lead were to be dealt with, it was necessary to consult the latest text books for methods to conduct quantitative and qualitative analyses. After considerable experi-

menting, the most reliable, accurate and speedy method adaptable to atmospheric analysis proved to be that of Schwartz modified by Diehl, and still further modified by Mr. Vogt.

In all operations for atmospheric analysis, where, owing to the nature of the work lead was supposed to exist, large volumes of air, not less than 1,000 litres, were aspirated through a battery of specially designed wash bottles containing doubly distilled water, by means of an air pump. The exact capacity of the pump having been definitely determined, the exact amount of air passing through the solution was known. After securing a sample, the solution in the bottle was decanted, the suspended material in the solution dissolved in nitro-hydrochloric acid, the solution evaporated to a small bulk, to which is added sulphuric acid, and allowed to stand for at least twenty-four hours. The solution is again evaporated until fumes of sulphuric acid appear, distilled water is then added, and the solution run through an asbestos filter devised by Mr. Vogt. The residue after thorough washing is transferred to a flask and strong ammonium acetate added, whereby the sulphate of lead is dissolved. The residue is again filtered, the filter being treated with hydrochloric acid, water, and finally acetate of ammonium and hot water. To the filtrate placed in the flask is added the solution of potassium bichromate in excess, whereby the lead is precipitated in the form of chromate. The excess of potassium bichromate is estimated by $\frac{N}{10000}$ solution of sodic thiosulphate. The two standard solutions were in every case standardized before every series of tests, in order to obtain exact results.

In some cases the lead was determined colormetrically by the addition of sodic sulphate and dissolving the lead sulphate in ammonium acetate as before mentioned, the brownish color formed indicates the presence of lead, corresponding to the exact bulk of the solution to be tested. By means of this method accurate results were obtained.

In the examination of gloves, aprons, clothing, floor sweepings and water from the washings of the hands of men and women, the method employed was as follows:

First, all organic matter was destroyed by using one of the well known methods according to Prescott, then dissolving the

residue, filter and convert into the form of a lead sulphate and estimate, either gravimetrically or volumetrically by means of the methods previously mentioned and modified by Schwartz.

In the analyses of urine for the presence of lead, large quantities of urine are necessary, as well as plenty of time, so analyses along this line was limited. The method employed was as follows:

A litre of urine was evaporated to dryness on a water bath, the residue moistened with nitric acid, and when effervescence has ceased, the bright colored residue was transferred to a platinum crucible, heated and carefully ignited. The crucible and contents together with distilled water were placed in a beaker, hydrochloric acid added, filtered hot and washed with hot water. To the filtrate was added ammonium hydrate and ammonium sulphide for the purpose of precipitating the lead with phosphates and iron. The filtrate was washed by decantation, an excess of hydrochloric acid added to dissolve the sulphide of iron and the phosphates. After standing some hours, the mass was filtered, washed with boiling water, and to the residue of the filter nitric acid added; after washing into a beaker, the material was evaporated to dryness, dissolved in a very little acetic acid and a very small quantity of sulphuric acid added, sufficient, however, to cause complete precipitation. A cloudy precipitate indicated lead, which was placed in small cylinders about six inches long which was compared with a similar cylinder containing an equal amount of a trial sample of sulphate of lead. By comparison of the colors it was easy to calculate the amount of lead present, where the color did not compare, new trial samples were made until the colors matched.

Where doubt existed as to the presence of lead in the atmosphere, the microscope was used upon samples obtained in places where colors known to be of lead origin were used.

TOXICOLOGY.

Lead, more than any other substance has engaged the attention of writers and investigators for many years, and the literature relating to the subject is voluminous. In fact, it would seem that the last word had been written and published upon lead poisoning, especially in connection with industrial life, and further

investigation would merely emphasize facts already established as to the danger and ravages incidental to its use.

The fact has been fully established that lead and its compounds are poisonous, the toxicity being in direct proportion to the solubility in the human economy.

Notwithstanding the researches and investigations made as to lead poisoning, there is still considerable discussion as to the means of absorption of lead into the system.

All authorities agree that it is absorbed through the alimentary tract, and this has been a definitely accepted fact for years.

It is asserted that there is absorption through the respiratory tract, and Dr. Goadby seems to have proved the accuracy of this theory. This would seem to confirm the findings of Tanquerel des Planches in 1840.

Considerable doubt exists as to whether lead is absorbed through the skin. Many authorities claim it is impossible if the skin is unbroken and healthy. M. Manouvriez and Prof. Proust assert that it is absorbed through the skin, and this view seems to be taken by a number of German authorities.

It was impossible to go into these matters owing to lack of time and proper facilities, so that no conclusions as to the last two theories can be ventured. As a result of close observations I am of the opinion that no matter whether the lead is inhaled, or deposited on the skin, there is always the liability of some of it entering the alimentary tract.

The susceptibility of individuals to lead poisoning varies considerably, though it is well known that children and females are affected more quickly than male adults.

In many cases symptoms of poisoning have occurred within a very short period after exposure to the poison. It is reported that fifteen and twenty years have elapsed before any trouble was experienced. In my own experience cases have been seen where symptoms developed over ten years after the individual had been entirely away from the influence of lead in any form.

It is fully conceded that the acute form of lead poisoning is rarely seen in workers engaged in the industries; it is deemed advisable, however, to describe the symptoms of the various forms.

Acute lead poisoning. The symptoms of this form usually occur after large quantities of a soluble salt, such as the acetate,

is taken into the alimentary tract. There is a sweet metallic taste in the mouth, and pain in the epigastrium, followed by colic. At times there is vomiting of a whitish liquid or curds. With the increased gastro-intestinal irritation, diarrhoea occurs, or the astringent action of the lead may result in constipation. The feces are black in color, due to the action of the sulphuretted hydrogen in the intestines converting the lead salts into the form of a sulphide. There is excessive thirst. Cramps in the calves of the legs are complained of, and muscular twitching may be noticed. In fatal cases there may be spasms, coma, and collapse.

Owing to the insidious nature of the poison, and the absorption of small quantities over a long period, the form of industrial lead poisoning seen is usually chronic.

Chronic lead poisoning. The symptoms of this form are attributable to disturbances of nutrition, and of the gastro-intestinal and nervous systems. No poisoning presents such a variety of symptoms which simulate those of many diseases, or even other poisoning.

Disturbances of nutrition. The primary symptom is a marked anaemia, resembling to great extent that of pernicious anaemia, or anaemia of renal disease. The percentage of haemoglobin and the number of red blood cells are reduced, but there is no change in the absolute number of leucocytes. In my opinion, the least sign of anaemia in a worker, confirmed by blood examination, should be sufficient cause to remove him from the influence of lead and begin treatment for poisoning.

The presence of a bluish line of the gums has always been considered as diagnostic of lead poisoning, even where all other signs fail. It is pointed out by Prof. Osler that it may be confounded with a line on, not in, the gums, which is readily removable by cleaning the teeth. In my experience, many cases with marked symptoms of poisoning have not shown the least sign on the gums, and in a large number of workers who were not exposed to lead in any form, a blue condition of the gums was found, due to an irritation and retraction of the gums resulting from tartar deposits on the teeth.

Gastro-intestinal symptoms. Among the first symptoms of lead poisoning is the "colic," known under various names as Colica

saturnina, Colica pictonum, painters' colic, Devonshire colic. The pain is of an intense character, generally in the region of the umbilicus, coming on in paroxysms of long or short durations, but relieved by pressure upon the abdomen. Poisoning exhibits itself in the form of dyspepsia or indigestion and severe constipation, and there may be merely attacks of nausea and vomiting.

Nervous symptoms. These are usually in the form of a paralysis termed "lead palsy," or affections of the brain termed "lead encephalopathy." So much has been published relating to these forms that but brief mention will be made of them.

The type of paralysis best known is that of the extensor muscles of the fingers and wrists, producing the well described "wrist drop." Preceding this condition there is usually an arthralgia with pains in the joints and muscles. The knees are usually first affected, next the elbow and shoulder joints. At times the muscles of the chest and neck are affected.

Encephalopathy is not at all common and is due to the action of lead upon the nerve centres. The symptoms include convulsions, delirium, coma, asphasia, hysteria and insanity.

The diagnosis of lead poisoning should not be difficult, when there is a history of exposure to lead, but many patients are treated for rheumatism, stomach trouble, nervous troubles, liver trouble, syphilitic paralysis, and even operated upon for appendicitis, when the case is one of lead poisoning, the cause of which has been entirely overlooked.

Where there is danger of mixed poisoning, such as arsenic, there may be slight difficulty of diagnosis. This is discussed in the report on arsenic poisoning.

Lead is stored up in the organs of the body for an indefinite length of time, and, when eliminated, it is in very small amounts through the urine, hence there are a large number of diseases remotely caused by the absorption of the lead.

Attention is called to the fact that analysts as a rule seek for lead in all cases of suspected adulteration of food or drink, and that cases may be traced to the use of lead pipe for drinking water or beverages. Thus care must be taken not to indiscriminately place the burden upon the industries.

Dr. Layet prepared a table of professions where the worker was exposed to lead poisoning. There are 111 of these, as follows:

| | |
|---|--------------------------------------|
| Refiners of lead. | Use of color in matches. |
| Lead fitters. | Manufacture of coach tops. |
| Cloth singers. | Coverings of wagons and coach hoods. |
| Cloth dressers. | Manufacture of leather varnish. |
| Artistic paints. | Manufacture of vitrified bottles. |
| Laundresses. | Manufacture of gloves. |
| Bakers burning old wood in oven. | Manufacture of pewter and lead toys. |
| Bronzers. | Manufacture of white rubber. |
| Brush makers. | Waxed linen, and napped cloth |
| Color grinders. | Varnished furniture. |
| Workers in hair. | Chemical furnaces. |
| Manufacture of cardboard. | Making of bottle caps. |
| Hatters. | Glazed cardboard and paper. |
| Beltmakers. | Manufacture of chromate of lead. |
| Armorsers. | Manufacture of white lead. |
| Tinkers. | Making of colored crayons. |
| Chauffeurs and mechanics. | Making of steel augers and bits. |
| Colorers of official paper bands. | Making of watered paper. |
| Makers of cigarette paper and wrappers. | Making of enamelled ware. |
| Iron wire workers. | Manufacture of pins. |
| Shoemakers. | Making of metallic cloth. |
| Dressmakers. | Oxychlorate of lead. |
| Decorators of porcelain. | Toy makers. |
| Lace makers. | Making of musical instruments. |
| Stamping of embroidery patterns. | Making of cartridges. |
| Solderers of cans. | Making of minium and massicot. |
| Gilders on wood. | Making of litharge. |
| Cabinet makers. | Making of acetate of lead. |
| Enamellers of electric porcelain. | Making of shot. |
| Bookkeepers using sealing wax. | Making of putty. |
| Assaying precious metals. | Making of tinted satin paper. |
| Tinning or silvering metal. | |

| | |
|--|---------------------------------------|
| Making of organ pipes. | Making of cut glass. |
| Making of material for pasting on windows to decorate. | Makers of perfumes. |
| Making of crockery. | Pharmacists. |
| Making of artificial flowers. | Painters. |
| Plumbers and tinner. | Coach painters, scrapers and glazers. |
| Lead workers and founders. | Decorators and painters. |
| Casters and polishers of letters. | Making plumbers' supplies. |
| Casters of brass, bronze, etc. | Polishing of cameos. |
| Manufacture of paste jewels. | Pewterers of tin. |
| Printers, compositors. | Enamellers of porcelain. |
| Journalists, proof readers. | Passanterie. |
| Lithographers. | Cloth cutters. |
| Lead rollers. | File cutters. |
| Lapidaries. | Glass cutters. |
| Fur dressers. | Locksmiths. |
| Carpenters, and handlers of old wood. | Calico printers. |
| Dealers and mixers of colors. | Telegraphists. |
| Jewellers. | Weavers. |
| Workers in copper. | Making of tile. |
| Lead miners. | Wire drawers. |
| Workers in glazes. | Handling of public documents. |
| Making metallic capsules. | Making of glass. |
| Fasteners of bottles with wire. | Glaziers. |

This is an interesting list, but when it is considered how widespread is the use of lead and its compounds it might seem that a list prepared of the few professions where there is no danger would speedily attract attention.

Statistics collected relating to lead poisoning are voluminous, but this fact stands prominent in all, namely, the danger appears greatest among painters, white lead makers, and workers in potteries.

The result of the first year of compulsory reporting of industrial poisoning in this State would indicate that the greatest number of cases of lead poisoning occurred among painters, and next among workers at storage batteries, and only a few cases among white lead workers.

A number of lay investigators report finding large numbers of poisoning among white lead workers in this State, but as no white lead works came within the scope of this investigation the statistics cannot be verified. From my own experience in visits to white lead works, there are probably many true cases not reported or recognized, and it is possible that many cases are wrongly diagnosed as leaded.

INDUSTRIES.

To properly investigate every industry wherein there was reputed to be danger from lead poisoning would prove a task of gigantic proportions covering a long space of time, and to make a complete study of the subject in but a few of the industries where most danger exists is a task of herculean aspect.

An endeavor was made to investigate as many industries as possible, and especially the factories having had cases occur which were reported to the Department. A table is appended showing the results of our visits.

During the course of our visits experiments were tried to discover some means for ascertaining the presence of lead in the system, before the manifestation of any symptoms, but all proved unsuccessful. One method proved of value in another direction. A French authority had reported that the use of an alkaline solution of sodium sulphide applied to the skin would aid in detecting the presence of lead in the system when there were no other signs. A 10% alkaline solution of sodium sulphide was made up and tried, but with no results, even on cases showing marked symptoms, but it did serve to show the presence of lead on the skin when the worker failed to wash properly. Some one hundred workers were tested after they had washed their hands thoroughly with soap and water after the day's work, or at noon time. Upon applying the sulphide solution, 65% showed the presence of lead (through the formation of a gray spot where lead sulphide was formed upon combination with the alkaline sodium sulphide), showing the absolute necessity of some means guaranteeing cleanliness. In several plants, where a popular brand of washing powder was used, fifteen workers who used the powder were examined and no lead found. It is probable that the ingredients of the powder converted such lead as was not removed into an in-

soluble sulphate, proving this type of cleanser to be an excellent one, and a means for prophylaxis.

In the description of the various industries visited, an attempt has been made to group them under special headings or classifications. In many instances there have been carried on in one plant a number of processes which might be grouped under different headings. In such cases the process has been referred to under the heading and the plant described as a whole.

Mining:

The danger in mining arises from the dust created, as well as from the workers soiling their hands and body. The danger from dust during the process of drilling can be eliminated, and in the Leadville, United States, mines drills are fitted with an arrangement to exhaust the dust generated.

Two mines at Maccomb were visited, but they had not been worked in many months. At the larger mine the former foreman was interviewed, and though he claimed never to have had any symptoms of lead poisoning, his appearance was very much like that of a lead anaemia. He stated the shaft was 75 feet deep with drifts of about 150 feet. Water filled the mine almost to the top of the shaft. Information was secured that several of the miners had suffered from severe colic, caused, it was said, by drinking water in the mine.

INDUSTRIES WHERE LEAD AND ITS ALLOYS ARE USED.

Smelting:

One small plant was visited where lead was extracted from junk. It was little more than a shed, and no work was in progress at time of visit. Pots were covered and provided with a hood to carry off the fumes. Soap, towels and goggles were furnished. It was admitted that meals were eaten near the pots. One man was seen, he was anaemic, and, in my opinion, suffering from effects of lead.

Lead Pipe:

In making lead pipe, the lead is melted in pots, then run into a chamber where it is forced out through a mould of the size desired, or, as in the case of plumbers' supplies, of a certain shape,

and then sawed off. In the manufacture of cables for electrical use, the core is passed through the hydraulic chamber and covered with the lead in exactly the same way as lead pipe is made. The cable is then coiled on a reel.

The danger in the process is from the fumes of the metal pot, and the escape into the air of oxides resulting from the cooling of the metal. There is also danger to the worker from getting the metal or oxides upon the skin, as in handling the product with unprotected hands.

Solder:

Solder consists of lead and tin with sometimes an addition of copper or zinc. The amount of lead in the alloy is at times 50% or more, according to the softness of solder required.

Fourteen plants were visited where lead pipe, solder, or lead cables were made.

Lead works. This is a two-story building, the first floor of which is devoted to making lead pipe and solder. The floor is 170 feet by 60 feet, with 12 feet height of ceiling. Doors and windows are located on one side and at front and rear end. Along one side of the building, and in a depression of the floor, are situated a number of solder pots and machines. In a dark corner at one end, about five feet from the floor, is another solder machine, and on the light side of the building in front are two pipe machines, the lead pots of which are hooded. Five of the solder pots are hooded, but one tin and solder pots has no hood.

In the making of plumbers' supplies (traps, etc.), after sawing off from the machine the edges are trimmed by filing, and then a small brass cap is soldered in the seal of the trap. There are a number of ways then in which the workers are liable to be affected by the lead used. Fifteen men are employed, none under eighteen, and mostly all adults.

While it is a difficult matter to keep a place of this character clean, there was room for improvement, as pig lead and sheet lead, together with dross and oxides, were scattered about. It was claimed the place was cleaned twice or three times a week, but twice a day is not any too often. During the work the men are furnished with gloves, which I noticed they wore. There was one sink, but no hot water. Meals were eaten in the shop.

In this place a clean pair of gloves was furnished one worker and analyzed after one day's use, with the following result, lead present, .0061 grams. A pair of gloves said to have been used for three days was analyzed and showed 1.37 grams lead. Air samples taken at machines while in operation showed no lead present.

A number of the workers are anaemic and complain of having had stomach trouble, one was undoubtedly a true case, having been employed two years, and having suffered from colic. One worker had been sixteen years with the firm, was robust, showed no symptoms, but had a distinct blue line along the edges of the gum, and in my opinion was leaded.

Lead Company. This plant formerly made white lead, but now simply acts as a storage, and on the first floor fronting the street has a lead pipe machine. The room is 80' x 50' and 12' in height. The lead pots are provided with a hood, and blades are fitted to main shaft to aid in circulating air. Gloves are furnished to the workers; hot and cold water and soap are provided. Meals are eaten in room where pipe is made. General conditions in this place are good, and an analysis of the air failed to show any lead present. The men have been employed a number of years, are cleanly, and no cases of plumbism were found.

Metal Company. This plant is devoted to the manufacture of solder and babbitt metal. The building is a comparatively new one-story brick structure with a concrete floor. Its dimensions are 50' x 60' and 40' to the peak of the roof. There are four metal pots situated under a very efficient hood. The metal is dipped from the pots and poured into moulds, during the operation the workers wear gloves furnished by the firm. The place is kept clean, and hot and cold water is provided. No meals are eaten in the lead room. There are three employees who have been with the firm some twenty years, and showed no symptoms of plumbism. Analysis of air showed no lead present.

Plumbers' Supply Co. This firm manufactures lead pipe and solder. A portion of the building is devoted to this work. First floor, 50' x 25', height, 12'; the place is a very open one. There are two pipe machines, the lead pots of which are hooded. One case was found. He had been working seven years at lead, and

for five years has been suffering from muscular and nervous troubles. He was anaemic and had the blue line on gums. He took no precautions, such as wearing gloves, and was not very cleanly as to person.

The second floor is of the same dimensions as the first and is devoted to the making of solder. There is one lead pot hooded, and solder is ladled out into moulds. There is one worker who has been seven years a solder maker, and for four years has been suffering from lead. He takes no precautions, is not clean, and drinks. Has a blue line in gum.

The firm furnishes no gloves to the workers, and there is hot water only when the boiler used for heating the plant is in operation. General conditions in the plant are fair.

A number of can companies were visited where solder was made, and are described under soldering.

Three plants were visited where lead cable was made and are described further on in the report.

Two foundries made their own babbitt metal.

Two storage battery plants made lead castings and are described under a special heading.

Company. This firm makes carborundum wheels and during the finishing, lead is used to bush (fasten) in the iron center of the wheel which fits on the spindle of the shaft. There are eight men engaged at this work, and there are four small pots in the center of the room. The shop is 60' x 200' x 17' high. An exhaust system is installed to remove dust from the dressing wheels, but at time of visit was not working effectively and considerable irritating dust was present in the air. There was no wash room for this portion of the works, but goggles and respirators are furnished, but seldom worn. No lead was found in samples taken, and no cases were found. There is room for needed improvement. Gloves should be supplied the lead workers, and the pots should be hooded. Proper washing facilities should be installed.

Several locomotive works were visited, and it was stated lead was used for filling in the counterweights on the driving wheels, and for babbitt on the bearings, the work being done practically

in the open. No work was being done during the time of our visit, and no cases of plumbism could be found.

Two newspapers were visited where linotypes were used, also stereotyping done, and are described further on.

Lead as a Tool Hardener:

With the forging of various steel objects, lead is used as a hardening agent. The steel is heated to a red color, then plunged into a pot of lead heated to about 1500° F. and then forged. During the process, the worker is exposed to the danger of the lead fumes, and also from the dust containing the oxide which results from cooling and during forging.

Arms Co., No. 1. This firm manufactures fire-arms (guns), and uses lead for tempering the safety springs of the guns. The lead is placed in small pans on an open fire and springs dipped in them. In the shop is a vacuum system of ventilation. Washing facilities are provided. The place is clean and no cases were found. No lead was being used at time of visit.

Arms Co., No. 2, Blacksmith Shop. Lead is used for hardening special steel, none being used at time of visit. When in use is in a small lead crucible with no hood. Place clean, no cases found among the three workers.

Cartridge Department. This is on the first floor of the office building, and is a large light room, 70' x 50' x 12'. A lead cable is fed to a machine which cuts the size of bullet. The bullet is put in a tumbler then fed to another machine which swages on a brass or nickel jacket, other machines fasten the bullet into the cartridge.

The machines are all operated by females; at the lead slug machines (3), the girls alternate in feeding slugs and removing swaged bullet. The danger is in the handling of the lead cable and slugs with the bare hands, especially as females are very liable to lead poisoning. No gloves are furnished, and none were used. The place is very clean, and special toilet and washing facilities are being installed. The girls are very clean and no cases were discovered.

Cutlery Company. This firm manufactures razors, and uses lead during forging, and later in tempering. The forge room

occupies the first floor. There are eight forges, each supplied with a lead pot provided with a hood. There is one special hardening pot provided with a hood and exhaust fan. The place is clean, washing facilities are provided and men are given time to wash up. No meals are eaten in forge room. Air samples showed no lead, and no cases of plumbism were found.

File Company. Files are no longer cut by hand on a lead base but are made by machinery, lead, however, is used for tempering. This plant is a small one employing five men. There is one metal pot which is not hooded. The men are furnished gloves. No washing facilities are provided. No cases of plumbism were found.

Several large wire works were visited and it was claimed that lead was not used, lime and fish oil being the material used for hardening and tempering, and no evidences could be found that lead was used in the annealing ovens.

In several large plants where tempering of steel was done, they claimed that no lead was used, and that saltpetre was used entirely for tempering purposes.

In one plant, described further on, lead was used as an alloy with aluminum.

Smelting Company. This firm makes special alloys, babbitt metal and solder. At time of visit no melting was being done, and a number of workers were on a spree. There are 20 metal pots with no hoods and only natural means for ventilation in use. Fifty tons of lead a year are used. There are no facilities for washing other than cold water. No respirators or gloves are furnished, and meals are eaten in smelting room. No cases of lead poisoning were seen among those at work, but this is not conclusive that the others may not be leaded. Conditions in this plant need considerable improving.

Brass, Tinning and Soldering:

In the casting of brass, lead is added just before pouring the metal from the crucible into the moulds. The addition of lead makes the metal soft and less brittle, being necessary where the brass is to be turned in lathes. The amount of lead varies with the degree of softness required. Red brass contains practically no

lead, whereas the yellow variety contains from $\frac{1}{2}$ to 5 per cent of lead. The principal danger is from the fumes, those exposed being the casters who place the lead in the crucible, and the moulders who pour off into the flasks. It is reported that the turners of brass are also liable, but no evidence could be found to confirm this statement.

Three large plants were visited having foundries, and a special description of these are given further on.

Brass Company. Casting room, 30' x 60', 20 feet high to Texas roof with louvre windows. Room is almost entirely open on three sides. There is one metal pot hooded. The percentage of lead used varies from 6 to 10%. There is no wash room or drying room, and meals are eaten in the foundry. General condition of the foundry is not good, and the workers are not careful as to personal hygiene. The caster who handles the lead admits having had lead poisoning, but shows no symptoms other than slight anaemia. Five other workers examined admit having had the "chills" (zinc poisoning), but give no evidence of lead poisoning. Analysis of air showed no lead present.

No symptoms were found among the brass turners.

Valve Company. This company makes valves and hydrants. Moulding. This department is situated in a building 120' x 53' and 18' high, having a Texas roof with louvre windows. There are two Schwartz crucibles for melting brass. These are under a hood which is connected to the boiler stack. The percentage of lead used never runs over 4%. Forty men are employed in this department, none showed any evidences of lead poisoning, but several admitted having had the 'ague,' which is also another name for zinc poisoning.

Hydrant Department. Lead is used for caulking in brass nipples or nozzles, and there is one pot where babbitt is made; the pot is hooded. One worker has been at this for fifteen years, gives no symptoms, but has typical lead pallor. At time of visit he was heating his lunch at the lead pot. An analysis of sample taken at the breathing level of the lead pot showed 5 milligrams of lead per cubic metre of air.

Although general conditions in the place were good, no special precautions were taken against plumbism.

Manufacturing Company. This firm makes pumps and employs lead very seldom; the largest percentage used is 6%. The shops are ventilated by a combined plenum and exhaust system. Washing facilities are good. Thirty men are employed in the foundry, and no evidences of plumbism were found.

Tinning:

In the process of tinning lead is used when a dull or dead finish is required, about two-thirds lead being used. In the bright finish lead is practically never used except when the tin will not run good, then about 8-10% lead is used.

Harness Hardware Co. The tinning room occupied the fourth (top) floor of one of the buildings. The room was 40' x 60' x 12' high, and contained pots for tinning and japanning. There was one pot containing tin for a dead finish, the percentage of lead was 66 $\frac{2}{3}$. None of the pots were hooded, and ventilation was by natural means. No tinning was being done at time of visit. Washing facilities are provided. It was admitted meals are eaten in the room and no special precautions taken to avoid lead poisoning. There are six males employed, but no cases of plumbism were found.

Copper & Brass Co.:

Tinning Department. This is a portion of the rolling mill, which is practically entirely open on all sides. There are five tin pots hooded, and in front of each pot is an inclined bench about 7' x 3'. A plate of copper is laid on the bench and a boy wipes it off with a jute mop wet with the flux, the tinner then ladles the tin out of the pot and pours it on the copper, the surplus being wiped off by another helper. No lead was found in the tin used, or in the air in the vicinity of the pots. No cases of plumbism were found. During the process there is considerable smoke. (Dr. Collis of Great Britain, recommends the hooding of the benches as well as the pots.) There are ample washing facilities. The helpers are Polish and Italian, the tanners Irish-American.

Casting Room. This is off the rolling mill and is 200' x 50', x 40' high. The roof is Texas, louvered. The room is practically open on three sides. There are ninety pots or crucibles, the tops of

which are flush with the floor, and no yellow or lead brass was being cast. The highest amount of lead ever used is 2%. There are washing facilities, but men furnish their own gloves. Ninety men are employed, and no cases of plumbism could be found, though history of "chills" were given by many.

East Mill, Casting Room. This is a building 100' x 150', x 40' high with a Texas roof louvred, the building being practically entirely open on all sides. The amount of lead in the brass used was 2%. There are six crucibles on the style of the Schwartz, and with no hoods. Sixty males are employed, but no cases of plumbism were found. There are washing facilities, and men are permitted to eat meals in the foundry. None of the workers were very careful as to matters of personal hygiene.

Soldering:

This is a process of fastening joints together to make them tight, it is usually accomplished by hand, though in the manufacture of cans it is often done by machinery.

In hand soldering the parts to be soldered are wiped clean and a dilute solution of hydrochloric (muriatic) acid used to remove oxides, sometimes rosin is used as a flux. A pointed copper iron, the tip of which is covered with tin (and known as the solder iron), is heated, and the tip is applied against a small bar of solder which melts and runs along the crevice or seam to be tightened.

The danger is from the fumes generated, and also from the handling of the solder in the bare hands. Some solder remains on the iron and this is liable to volatilize when the iron is heated in the small gas oven termed the furnace.

In the machines, the solder is placed in long troughs which are heated by gas. A traveller carries the can along and the seam dips into the solder, then a little further along, the surplus solder is removed by buffing wheels. In this process the danger is not only from the fumes of the solder pots, but also from the dust created by the buffing wheels, and in the oxides formed when the solder cools.

In soldering, the furnaces should be hooded, and in the machines, the solder pots and buffers should be hooded and

attached to an exhaust fan. All workers handling solder should have gloves.

Stamping Company, No. 1. In this factory both tinning and soldering were done. Tin pots were hooded and analysis showed no lead was used. Soldering is done all over the factory, gas furnaces, not hooded, used to heat the irons. Gloves are furnished to the workers and are used. No cases of plumbism were found. Some of the stamped ware is painted, and in the paint shop one man was found. He had been employed fifteen years, and though giving no evidence of symptoms, had the typical pallor of plumbism. Hot and cold water was furnished for washing. Meals were eaten in the factory. General conditions as to cleanliness were good. Air samples taken where soldering was carried on showed no lead.

Stamping Company, No. 2. This plant does tinning and soldering, but was shut down for inventory at time of visit. Analysis of sample from tin pots showed no lead. Both males and females are employed at soldering, and a patent soldering iron heated by gas is used. There was no evidence of there ever having been any cases of plumbism among the workers.

There is a special lunch room for the employees, also a wash room having hot and cold running water. General conditions in the plant are good.

Sprinkler Co. This firm makes fire sprinklers, but the only work requiring handling of lead done in the factory was soldering the fusible plugs in the sprinkler. This was in a small room 25' x 25' x 14' high, on the third floor, and was well lighted. Five men are employed. There was one solder pot completely enclosed and piped to the chimney. Washing facilities were provided and no meals eaten in the room. No cases of plumbism were found.

In a number of plants visited, soldering was carried on, and is described further on.

Use of Lead or Tin Foil:

One large chocolate factory was visited where foil was used to wrap the chocolates in. Girls were employed at the work. The factory was a modern one with the best sanitary equipments and comforts for the employees, and all precautions were taken to

safeguard the health of the workers. An analysis of the foil used showed slight traces of lead present. No evidences of plumbism were found among the workers and the danger from the use of this foil is practically nil.

Tin Cans:

Can Co., No. 1. This is a large, light, airy one-story factory building 125' x 125' x 14', with a saw-tooth roof. All work is done automatically by machinery. There are thirteen seam soldering machines and six end soldering machines. The solder pots and buffers on the machines are all under hoods connected with an exhaust system, and no fumes or gases are appreciable. Tests showed lead present, 3.6 milligrams per cu. metre of air. Sample taken at the lead pot of a seam soldering machine. There are ample washing facilities but no hot water. Soap is furnished and time given the workers to wash up in. No cases of plumbism were found.

Can Co., No. 2. This company makes its own solder.

Solder Department. This is in a building 60' x 25' x 14' high, light and airy, five males employed. There are four solder pots hooded and connected with an exhaust fan. There is one machine for flat solder, the metal pot of which is hooded. No solder was being made at time of visit. The men wear gloves while at work. One of the workers, who had been there five years, had a slight pallor, but was rather a doubtful case. There were no special washing facilities and meals were eaten in the room.

Hemming room. This is a room 40' x 40' x 25' high. A solder hem is stamped on the edges of can tops by machinery. Seven machines were in operation, with girls as operatives. There is danger in this process through contact with the lead and the workers should wear gloves. No cases of plumbism were found. Girls are cleanly and go home for meals.

Solder room. This is a large light room 175' x 50' x 40' high. The roof is a Texas with louvre windows. There are four lines of machines. Machines are hooded, but, owing to changes being made in type of hoods, side seam soldering machine had no hood. A sample of air taken showed 2.6 milligrams of lead per cubic metre of air, and samples taken at end soldering machines which

were hooded showed 1.6 milligrams of lead per cubic metre of air. This was probably due to the disarrangement of the hoods over the machines. The temperature of the solder was 800° F. considerable below the point of volatilization. Gloves are furnished workers who handle the solder. There are no special washing facilities and meals may be eaten in the solder room. One worker who gave no history of symptoms had the blue line in the gums. Another worker complained of leg cramps and indigestion. Both were undoubtedly cases of plumbism. One case was reported from this factory, but could not be found.

Can Co., No. 3. This plant makes their own solder. Solder room is a small dark place off the engine room. At the time of visit it was closed.

Can soldering. This is a building 200' x 75' x 45' high, the roof having a Texas with louvre windows. There are employed 200 males and 100 females. The females do not handle solder. All machines are equipped with hoods leading to exhaust fans. There are no special washing facilities and meals are eaten in the room. Tests showed no lead present, and no cases were found. There is room for considerable improvement in this plant.

Can Co., No. 4. This is a small plant where hand soldering is done. Only four men employed at soldering. Workers are supplied with gloves, towels and soap, there is also hot and cold water, but meals are eaten in solder room. No cases of plumbism were found.

Industries Where Lead Compounds are Used.

Paints and Colors:

In the manufacture of dry colors the pigment is first dried then put into mills for grinding. In the manufacture of paints, which are really oil colors, the dry color is put into a mixer, oil added, and by means of rotary paddles in the mixer the oil and color are combined and a body formed, which is used for paint. The principal danger in these processes is from dust created in handling the dry powder. After the color has been put in the mixer with oil, the only danger is from the material getting on exposed portions of the workers' skin and not being washed off properly.

Paint Works, No. 1. This is a small plant making oil paints, vermin exterminator and paris green. (See also arsenic report.) Both lead and arsenic colors are made. Very little grinding is done, and none at time of visit. The work is done on the second floor, the room being irregular in shape but averaging 60' x 45' x 14' in height. No provisions are made to keep down or remove dust created in handling the dry color. Washing facilities are inadequate, and workers are unaware of the nature of the ingredients used.

One worker mixing and grinding for three years gave evidences of plumbism.

On boy, sixteen years old, at work on mixers for only a few months, had typical lead pallor and gave evidences of plumbism.

Paint Works, No. 2. This plant makes oil paints and putty. It is an old three-story brick building situated on the river front. Third floor. Here are two chaser mills, which are really large grindstones continually wheeling around in a circular receptacle, and so grinding the contents very fine, and at time of visit were not operating. The mills are entirely open, and when in use, the dry lead color is dumped in, oil added, and the chaser started. The result is considerable dust, and the heavy incrustations of lead on the floor and paint on the workers' clothes prove this. The color is run down through hoppers to the mixing machines on the second floor. Here all the work is done in oil, but the floor is covered with thick layers of paint, and the workers' clothes and hands are covered with it. The percentage of lead used is about 25. There are no washing facilities and meals are eaten in the factory. No provisions whatever are made for taking care of dust, and the workers, mostly foreigners, know nothing of the dangerous nature of the materials used.

One worker was found with the blue line of the gums.

Another worker had typical lead pallor. Neither gave any symptoms, but both were undoubtedly leaded.

The building is unsanitary, and vast improvement will have to be made to make it safe for workers exposed to lead.

Paint Works, No. 3. This is a large plant making oil colors; white lead was formerly made, but not any more. A large part of the output is a paint having baryta and zinc as the basis in

place of lead, and which, it is claimed, does equally as good work as a lead paint.

The building where the lead paint is made is three stories, the upper stories being used for mixing and grinding. At the time of visit no grinding of dry lead was being done. The colors after being mixed in oil are filled into cans for sale purposes. Nine males and three females are employed. Hot and cold water, soap, and individual towels are furnished by the firm. Rooms are partitioned off the mixing rooms for hanging up clothes and eating lunch. The majority of the men and girls ate their lunch in the mixing rooms, and the superintendent did not think it of much moment. But few of the workers washed up before eating, and none seemed to attach any danger to the use of lead in the work. No hoods were provided for the chaser machines, and no special means were installed to take care of any dust created.

Putty room. This is a one-story building, 25' x 40' x 10' high. There is one large chaser mill entirely open. Very little lead putty is made, when used it varies from 8 to 35% lead, the rest is whiting, linseed and corn oil. The danger is when the dry material is placed in the chaser. At time of visit there was no dust, and so no lead showed in air samples. Two men are employed. No cases of lead were found among the workers, which is rather strange considering conditions found at time of visit. There is room in this place for improvement of conditions.

Paint Works, No. 4. This is a small plant making oil paints. Only a little mixing was being done at the time of visit. The place is clean, light, and airy. There are but two or three workers employed beside the proprietors. Washing facilities are ample, and care taken to clean up personally. No meals are eaten in the paint room. No cases of plumbism were found.

Paint Works, No. 5. This is a small plant, employing three men. Place is light. No dry colors were being handled at time of visit. Hot and cold water, soap and towels furnished. One worker admitted having been treated for lead poisoning two years ago, now shows no symptoms. This man chews tobacco. General conditions good, but no provisions to keep down dust.

Four other plants were visited, but no lead was used, as they made metallic paint, which has iron as a basis.

Varnish:

In the manufacture of varnish lead is used to color and aid in quick drying. The lead compounds used are lead acetate, litharge, and red lead. The varnish is placed in large kettles and heated, while heating, the litharge mixture is sprinkled over the top, then mixed in.

The danger is from the dust, both in the mixing room and while sprinkling on top of the varnish kettle.

Varnish Co. This firm makes varnish and enamel, the latter being really a colored varnish.

Dryer or mixing room. This is a small room 20' x 15' x 12' high, having one skylight in roof. The colors are kept in bins, and when weighed out a scoop is used, there being no provision to take care of any dust created. At time of visit no mixing was being done. The men wear gloves; and of three seen, none showed evidences of plumbism.

Chimney room. Here are five chambers, about six feet square, with an opening in the rear leading to a large chimney, and a coal furnace in the centre of the chamber. The large kettles of varnish are run into the chamber over the furnace, and the worker sprinkles the lead mixture on top with a shovel. From observation, most of the dust is carried away from the worker toward the chimney opening.

On one floor of the main building color mixing is done dry for making enamels. But one worker was seen at time of visit, he wore respirator and gloves, but no mixing was being done. The mills are all tightly enclosed, but there is no method to handle the dust created in scooping from the barrels to the mills.

The firm tries to have a sanitary factory, special wash room with shower baths is provided, and towels and soap furnished. In the majority of the other processes in the plant, dust and fumes are handled by hoods and exhaust systems. No cases of plumbism were found or reported from this plant.

Oilcloth:

But one factory outside of Greater New York makes oil cloth. In this plant baryta and zinc have replaced white lead as a basis for colors, and they claimed lead colors are not used at all. This

firm makes their own varnish, and in this process litharge is used. The amount used varies from three ounces per gallon of linseed oil to eight ounces per 100 gallons of linseed oil, depending upon the heaviness required.

It was admitted that chrome (lead colors) were used at times, also that several years ago there had been some cases of lead poisoning among the workers who handled the varnish containing the small percentage of litharge.

The plant consists of a series of old one-story brick structures. The mixers are situated in rooms which are practically all open, but with no provisions for taking care of the dust created in putting dry color in. There was being installed at time of visit a dustless mixer. The colors are carried by an inclosed elevator to an upper platform and then dumped into the mixer, the entire process being enclosed so as to keep down the dust.

Linseed oil room. This is practically an open brick building, 100' x 50' x 15'. The pots are on top of a brick furnace. Over the pots is placed a cloth hood, connecting with an iron vent pipe, to remove fumes. The oil is pumped up into the kettles, and the worker sprinkles the litharge on with a shovel. During this process very little dust was noticeable. There are washing facilities, but no gloves, respirators, soap or towels are furnished. The workers do not seem to realize there is any danger from the lead used. Most of the workers wash up, and go home to meals. No cases of plumbism were found.

Artificial Leather:

This is practically oil cloth, and is made in the same way, with the exception that the coating is a secret process in which nitro-cellulose (gun cotton) is used.

There is but one plant in the State making this material, and the danger from lead is in the use of chrome colors. Arsenic colors are also used at times.

The colors are mixed into a paste, then carried to the machine (which is long and enclosed), here it is placed in receptacles at one end of the machine and applied evenly to the backing fabric by means of rollers. The long enclosed runway is for drying purposes.

In oil cloth, after drying on of pattern, the fabric is run through a set of rollers and varnish poured on, then into another drying room.

The danger from lead poisoning in this plant is confined practically to the compounding room, from the dust created in handling the dry colors, and in the mixed product adhering to the unprotected skin.

The mixing building is 100' x 100' and roof averaging 14' in height. There is a marked odor of amyl present from the nitro-cellulose used. Six males are employed. The colors are dumped into open pans and castor oil added. During this process there is quite some dust. The mixture is then run through a set of rollers to thoroughly mix, and is then put in cans and taken to the coating room. The lead colors are used as follows, white lead 2%, chrome green 20%. The analyses of the air taken near the mixing failed to show the presence of any lead, but upon microscopic examination, fine green particles were seen which undoubtedly were chrome green, proving that very minute quantities of lead compound were present in the atmosphere as a result of mixing. No special means were provided to take care of dust created during course of mixing. The coating rooms were undergoing alterations at time of visit. Washing facilities are provided, and no meals are eaten in the factory. The company has a physician, but no cases of plumbism were ever reported, and none could be found at time of visit.

In this plant there should be a system of ventilation, and an exhaust system to take care of dust and fumes.

Potteries:

A special report on the pottery industry will be found in the report of the Commissioner of Labor for the year 1909. In it are described at length the various processes. In this investigation attention was directed mainly to the processes where lead was used. These are glazing and decorating.

In glazing there has been considerable controversy as to leadless glazes, the best of authorities agreeing that lead is necessary, but the danger may be minimized by using fritted lead, which is raw lead, borax and silica fused together at a high temperature.

The majority of the potteries decorate either by hand or by means of litho transfers, and some make their own transfers. This, of course, is really a branch of the lithographing industry, and the danger resulting is from the dust arising in handling colors containing lead.

Pottery No. 1 (see Plant No. 1, 1909). Conditions were changed since the time of the special investigation, it was noted that in the glaze dipping boys who had been assistants when last seen were now dippers. Conditions as to cleanliness are somewhat better, and aprons are furnished in the dipping rooms, also soap and towels.

Front dipping room. One male and two females. Female helpers' hands were washed after four hours' work and samples of the water analyzed. There was found 2.1 grams of lead, showing the danger of handling food without washing hands first. This was only from handling the ware after it came from the dipping tub.

Rear dipping room. Here were four males and eight females. No cases of plumbism were found. One of the dippers was a robust young man who at time of last visit was a thin boy acting as assistant. The workers all declared they washed up thoroughly, and at time of visit they did, which may account for the absence of cases.

Hand decorating room. This is a small light room on the second floor. There were six females applying colors by means of a small brush. Small girls grind the colors in oil, using a mortar, which is usually their first job, for after a few weeks at this they go at bench work. In the large decorating room are a number of young women and men who line the ware (decorate with fine stripes) with bronze color. Often the china is tinted. This is done under a hood connected with an exhaust. Tinting is usually done by young girls.

In the making of the litho transfer a press is used, and the color applied to an engraved plate. A very thin paper is run between the color plate and rollers and receives the impression. Young girls cut the paper into strips for easy application to the ware. The transfer, color side to ware, is applied, rubbed with a small tool to aid in fastening design, and then the paper is cleaned off, leaving the color design on the ware.

As the colors used in decorating are ground in oil, there is little dust seen in this portion of the work. There is a wash room, with hot and cold water, and soap and towels are furnished. Meals are eaten in the decorating rooms. No cases of plumbism were found.

Plant No. 2 (see No. 2, 1909). This pottery is one of the largest in the State. An attending physician is employed, and printed notices warning of the danger from lead are posted throughout the building.

Dipping room. Three male dippers and three boys to carry dipped ware to drying rack were employed. Gloves are not used by the dippers. Because of the high temperature and the stacks of dipped ware drying, it is a difficult matter to keep the room free from dust. Fritted lead is used in the glaze, and the dipping room is kept dampened during the day, and thoroughly cleaned at the end of the work day. Analysis of sample of air taken in the centre of the dipping room showed lead, due undoubtedly to the slight dust from the drying ware. In cleaning the glazed ware before going in and after coming from the kilns, all work is performed under hoods, and dust is removed by exhausts.

In the lithographing department 12 females are employed. After the litho transfers come from the presses they are dusted with flour by hand, then run through a machine to dust off the flour. All processes of hand dusting are done under hoods, and all machines are provided with exhaust systems. Twelve quarts of milk are furnished daily to the workers.

The general conditions in this plant are excellent for a pottery. Washing facilities are provided, no meals are permitted to be eaten where lead is used, and the workers are encouraged to observe the rules of personal hygiene. No cases of plumbism were found among the workers, and no cases were recorded by the physician.

Another large pottery was visited, but no work was being carried on. It was evident that means were being taken to make it as sanitary as possible upon resuming operations.

In the report of the British Commission as to lead in potteries, they attach the greatest danger to the use of lead in glazing, and find that in the color portion of the work there is not much cause

for alarm. While the amount of lead used in the decorating of china is small in comparison to glazing, and the amount of dust encountered slight, the danger is present, and the workers should be as carefully guarded as where the danger is greater.

Glass. There are two kinds of glass manufactured. A flint glass containing no lead, and used principally for bottles, and a glass containing lead compounds, and other poisonous ingredients. (See also arsenic report.)

The purpose of the lead is to make a glass that is soft enough to work, as in making art glass, and some compounds are used for coloring purposes.

The lead and other compounds are weighed and mixed in one room, then taken to the furnace room and mixed with a quantity of old glass; the entire mixture is then put into the furnace or pot, and fused. The material in the pot is kept in a liquid state by high temperature, and into this the glass blower dips his pipe, taking out the amount he wishes to work.

The greatest danger is from the handling of the dry ingredients, and inhaling the dust created during the weighing and mixing.

Six glass factories were visited, but analyses of material showed but two of them used a lead glass.

Glass Works, No. 1. This is one of the largest glass works in the world, making glass of all colors and for all purposes. There is a small emergency operating room in connection with the plant, but no regular attending physician.

Mixing Room. This is a long room off the old furnace rooms. Several males are employed here, and there are two large mixing machines. The material is weighed out and shovelled into an open trough. After the full amount is put into the trough, it is taken to the mixers and either shovelled in, or dumped into a receptacle which is hoisted to the top of the mixer and there dumped. During the processes no measures are taken to carry away the dust created. The men are furnished respirators but none wear them. No special washing facilities are provided, and the men ate their meals in the room. The help are all foreigners and not clean.

Two cases of plumbism were found.

One worker had been there thirteen years, and had been sick with muscular pains for one year. Blue line of gums was marked.

Another worker had been there a little over a year, he had epilepsy, also complained of muscular pains and showed a marked blue line of the gums.

The new furnace room is as near perfect as such a room can be. The only danger is to the workers mixing the ingredients and dumping into the furnaces. No precautions are taken to guard against dust.

Analyses of samples taken in mixing room showed 3.3 mg. lead per cubic meter of air. This shows the danger present.

None of the workers exposed to the danger are aware of it, and as they understand very little English, it is hard to make them understand. There is room for considerable improvement in this plant.

Glass Works, No. 2. This is a large glass works making art glass. At the time of the visit no mixing was being done. Lead is used in the form of litharge, red lead, and chromes. The mixing is done in an old portion of the building, but a new mixing room is under course of construction, and will be made as hygienic as possible.

The furnace room is not very well lighted, owing to the building being an old stone structure. Samples of air taken near the furnaces failed to show any lead upon analyses.

There are no special precautions taken in this plant beyond furnishing respirators to the mixers, who will not wear them. The majority of the help are foreigners, and have no knowledge of the danger of poisoning from the ingredients used. Washing facilities are inadequate, and the majority of the help do not wait to wash up before leaving, or eating meals. No cases of plumbism could be found, but none of the mixers were seen, which may account for this fact.

Cut Glass:

The manufacture of cut glass consists in cutting designs and patterns on a piece of glassware known as a blank. Most of the glass cutters have the blanks made by the large glass works. The process of cutting is as follows.

The design is first cut into the blank by emeries, and is termed rough finish. The design is now gone over with a pumice finish termed a smooth finish. During the cutting processes, sand and

dirt get into the designs and must be removed, so the ware is washed in soap and water, but as this fails to remove all the silica, stronger measures are necessary. The ware is coated with paraffine and beeswax, leaving the surface to be cleaned free, and is then dipped into hydrofluoric acid. The acid dissolves the sand and silica, and would also dissolve the glass, but it is quickly transferred to sulphuric acid to neutralize further action. The ware is again rinsed in water and sent to the refinishers. Here the glass is treated with wooden or felt wheels, and also brushed with a putty containing lead and tin. The ware is cleaned and finally wrapped in tissue paper for the market.

The danger from lead poisoning in the industry is in the use of the putty, and the workers who refinish and handle the ware after putty finishing are most exposed.

The polishing with the putty is a wet process, but the material scatters all over and dries quickly, so that there is quite some dust containing lead resulting from the work.

Factory, No. 1. This occupied several floors in one of the buildings of a large glass works. One floor was devoted to cutting and finishing. But two men were using putty at time of visit. The process is a wet one, and workers' clothes as well as hands and face were spattered with the material used. Very little information could be secured as the workers were foreigners, and no cases of plumbism were seen, though one case had been reported to the Department as having worked in this place. There were no special facilities for washing, and meals were eaten in the work rooms. The workers had no knowledge as to the poisonous nature of the material used.

Factory, No. 2. This plant has its blanks made by a large glass works. The refinishing room is 70' x 40' x 25' high, and very light. There are 12 males who alternate on the different processes including the putty finishing. The men are mostly Italians, but understand that lead is used in the putty. Soap is furnished for washing. Respirators are furnished the men but not used. The place is kept clean, but the workers do not follow the rules of personal hygiene very closely.

Six cases were found showing the blue line of the gums, but only four gave any symptoms, these suffered from indigestion and muscular pains.

This firm made its own putty in a special outbuilding. The room was 20' x 30' x 10' high, well lighted. There were two pots hooded. Only one worker employed, and he was not in the room continually. Lead from the lining of tea chests was used, and the proportions were two-thirds lead and one-third tin.

In this industry the principal measures to be taken are cleanliness, especially on the part of the worker. While there may be some dust in the air it is negligible, as the results of our analyses failed to show any lead present in the samples taken.

Rubber Goods:

In the manufacture of rubber goods lead compounds are used as an aid in vulcanizing, curing or hardening of the rubber as well as for pigmentation or coloring purposes.

After the gum rubber has been thoroughly washed to remove the dirt, it is put through a masticator, which is a machine having revolving rollers which makes the rubber smooth and firm. The rubber is now run through a set of rollers in the machine called the grinder, and the pigment compound gradually added until it is thoroughly mixed. Sometimes the addition is done at the masticator, as both machines are similar in their action. The rubber is now ready for any purpose, and in many cases is made into material which is vulcanized, that is, put into a heating chamber, and, with the addition of sulphur, made hard and durable. The temperature of the chamber is not sufficient to volatilize the lead, and merely causes a uniting of the sulphur and compound to form a sulphide. The rubber is dusted with talc or chalk before going in the chamber, and the sulphur mixture is placed in a small vessel on the floor inside of the chamber.

The danger exists principally where there is dust created in handling the dry pigment combination, such as mixing and masticating.

It is claimed by some authorities that poisoning has occurred from handling the sulphide, but if this is true it is only in isolated cases.

Samples of air taken at the heating chambers and in the finishing of the vulcanized product showed no lead present. An analysis of rubber as it came from the mixer showed about 25% lead present, and an analysis of the vulcanized product showed almost the same percentage, showing that the danger is practically confined to the compounding and mixing.

Five plants were visited where lead was used in the rubber, three are described under electrical works.

Rubber Co., No. 1. This is a large plant manufacturing rubber goods for all purposes, and of all colors. The building is a modern four-story concrete structure, ventilation by natural means.

Weighing room. This is a large light room on the first floor, partitioned off from the mixing room. Ingredients are kept in bins, and hand scoops are used in taking material out to be weighed and sifted. No special means are installed to carry away dust generated during the handling process. New mills are being installed wherein mixing, weighing and filling of containers is all inclosed and no dust escapes. At time of visit no mixing or weighing in this room was being done. Samples of air were taken, but showed no lead present.

Mixing room. The machines were in separate inclosures, but with no exhaust connection to handle the dust. A sample taken in one room during putting in of ingredients showed eight milligrams of lead per cubic meter of air. The worker was covered with dust, had been fifteen years in the factory, two years at mixing, and yet showed no evidences of plumbism. He claimed to be cleanly, and did not drink or use tobacco. All the workers engaged in the weighing and mixing processes were covered with dust, and did not use the respirators furnished. No cases of plumbism were found.

In the rubber, litharge and chromes are used, and it was stated that to every pound of rubber there was about three-quarters of an ounce of litharge, which does not seem to agree with the findings of our analyses.

Analyses of air were taken in the cementing room, where the vulcanized product is assembled and finished, but no lead was found, due to the fact that the room was extremely free from

dust. No cases of plumbism were found. It was admitted that the workers in this process are very migratory, and mostly foreigners who understood very little English. But in my opinion there is very little danger in handling the vulcanized product.

The firm has adequate washing facilities on each floor, they furnish the workers exposed to dust with respirators, and try to keep the factory sanitary. The character of the help are not of a class who follow strictly rules of personal hygiene.

Rubber Co., No. 2. This is a small plant making rubber tubes and tires for motor vehicles. No weighing was being done at time of visit, and but one mixer running.

The compounding room is large and light, but no provisions are made for exhausting dust. There was one worker present. He had been here three months and was some four years in the rubber business. Was anaemic and gave history of gastro-intestinal trouble, and in my opinion was suffering from plumbism.

There were four mixers, none of which were provided with means for taking care of dust created. At the one mixer in operation no ingredients were being added. Gloves were furnished the workers, but there are no special washing facilities, and meals are eaten in the factory. There is room for much needed improvement in this place to make it safe.

Enamelled letters:

In this industry the letters are first cast and then enamelled in different colors. The casting material may be of lead or other metal, and the enamel is really a paint baked on. The danger is from handling lead and colors containing lead, and the fumes arising during casting of lead.

Plant No. 1. This is a small factory occupying a two-story frame structure. There are five males and fifteen females employed. There is one small metal pot not hooded. Letters are of cast lead, and when cool are finished by filing, which is done by the young women. There are no special provisions for washing, and workers go home to meals. The general condition of the place and workers as to cleanliness was good. No cases of plumbism were found.

Plant No. 2. This is a small plant employing three men. Fifty per cent lead is used in the material of which the letters

are made. The lead metal pot is small and unhooded. There are no special washing facilities, no meals eaten in the place. No cases of plumbism were found.

Enamelled Ware:

One large plant manufacturing enamelled household ware was visited. Analyses of the ingredients used for enamelling failed to show any lead present.

Dyeing:

Two large woolen mills and one large carpet plant were visited, and analyses of the dyes used and samples of fabric made failed to show any lead present.

Two large silk mills and one silk thrower were visited. In the preparing of silk, termed throwing, nothing is used but soap and water, with oil for finishing.

In dyeing and weaving of silk tin instead of lead is used for weighting or giving body to the silk, and no lead dyes are used. Samples of silk were analyzed and no lead found.

Shoes:

A number of large shoe factories were visited, but it was claimed that no lead preparations were used in dyeing or finishing. Samples of different preparation were secured and analyzed.

In two of the plants visited tan shoes were made, and before leaving the factory were examined and slight defects of finish were touched up with a tan dressing. But one or two men were employed at this work. The analyses of these tan dressings showed that they contained small quantities of lead, probably as a chrome. The average number of bottles used is about twelve a year, or twenty-four ounces of mixture. The workers handling the fluid were not very clean, but no cases of plumbism were found. It is evident that in this industry the only danger from lead is in the retouching of the tan shoes, and is limited to a very few workers.

Coated Paper:

Two large plants were visited where coated paper was made. It was claimed no lead was used, and analyses of the ingredients used failed to show any lead present. None was found in the air.

Harness Making:

A number of harness manufactories were visited, but no lead was found to be used in dressing or finishing the leather. In punching holes in various portions of the harness some workers used a small lead plate as a base, but many used a thick piece of leather for the same purpose. No cases of plumbism could be found, and it seems rather remote to classify the work as one liable to poisoning from lead.

Chemical Works:

One plant was visited where chlorine products had been made in a lead lined chamber (see also arsenic), but this had been done away with and concrete chambers were now used. They had never seen any cases of plumbism during this work.

One plant making sulphuric acid was visited. In this industry large lead chambers are used during the process of manufacture, and the acid at times becomes contaminated. Samples of the acid were analyzed, but no lead was found. Samples of the fumes in the plant failed to show any lead. No cases were found, and the superintendent said he had never seen any evidences of leading in all the years he had been connected with acid making. Poisoning in this industry is probably an uncommon occurrence.

Jewellers:

A number of jewellers were visited as to the use of lead. Some of the solder used contains a minute quantity of lead, but enough is not used to be dangerous. Formerly precious stones were set in a lead bed during the process of cutting and polishing, but plaster of paris is now used. The danger in this industry from such work is certainly not dangerous.

One large concern was visited where ornaments were made of lead and then enamelled.

The lead is melted in small pots which are provided with hoods and pipes. The lead is poured into small moulds and later on enamelled. Only males are engaged at casting.

In the enamelling, colors are ground and mixed in inclosed machines. The product when ready for use is an oil mixture, and there is no dust in its use. Small amounts of the colors are applied to the novelty (which may be of any metal) by means of

a small metal point. The novelty is then put into a special oven and at high temperature practically baked on. The ovens are hooded and piped to an exhaust pipe. Thirty females are employed in putting on the color or enamel, but none showed any evidences of plumbism, or were any cases known of.

While the quantity of enamel used by each worker is small, still there is the remote possibility of getting it into the system through lack of cleanliness.

Embroidery:

A number of embroidery places were visited and samples of the powder in use analyzed. No lead was found present. The only danger in this work would be from the use of lead carbonate as a powder for tracing patterns, but it seems very remote, as none of the manufacturers use it, or recommend its use.

Dairy Implements:

A number of cases of poisoning had been reported from a firm making a cream separator. A visit was made to the plant, and it was discovered that in a portion of the finishing process of some of the parts a black putty consisting of 65% lead was put on the metal part, put into an oven for baking, and after hardening was sandpapered.

The room was a large light room on the first floor of a new building, ventilated by a plenum system. An analysis of the air of the room showed no lead, but a sample taken at the breathing level of a worker while sandpapering showed 68.8 milligrams of lead per cubic litre of air, clearly proving the danger was from inhaling the lead-laden dust created during the process of sandpapering. The remedy in this case is an exhaust system.

Four cases of lead poisoning were found in this part of the plant.

One worker showed blue line of gums and had colic off and on for two months.

Another worker, employed one year, gave no history of any symptoms, but gums showed blue line.

Worker had been employed for eight months then remained away for eighteen months. Had slight blue line of gums and complained of wrist and arm trouble.

The star case was a worker who had been there for ten years and was being treated by a physician for stomach trouble. He was anaemic, had blue line of gum, and a marked paralysis (wrist drop) in both wrists. He was unaware of the fact that he was suffering from lead poisoning, and no one in the factory ever thought of such a thing.

This firm also does tinning and soldering. No lead is used in the tin, and no cases of plumbism were found in the tinning shop.

Soldering is done both by hand and machine in a large, light, airy shop. The machines are gradually replacing the hand work. Neither the solder pots of the machines nor the furnaces of the hand solderers are provided with hoods or exhaust systems. No cases of plumbism were found among the solderers.

The firm have ample washing facilities, but furnish no towels. They aim to have a sanitary factory, but do not realize the danger incidental to the use of lead. The workers should be instructed as to the danger, and special precautions, such as exhaust systems, use of respirators, and personal cleanliness, should be insisted on.

Several burial casket firms were visited, but they claimed that the only way lead was used was in soldering, and that to a limited extent. No cases of plumbism were found, and no conditions were found which would indicate any danger to the workers from lead poisoning.

Painting:

That painters are liable to lead poisoning is a common fact. There is no doubt that a large percentage is due to faulty personal hygiene. In indoor work there is no doubt a part of the danger lies in sandpapering or scraping paint, and it was with this phase of the work we tried to confine ourselves. The plants visited were those where vehicles were made. In order to get a good surface for a fine finish, the various portions of vehicles, but more especially the body, is sandpapered both before and after the application of paint. During the process of sandpapering a fine dust is created, and inhaled by the worker. If lead is on the part being sandpapered, there is, of course, danger of inhaling the fine particles set loose.

In the majority of plants, there is plenty of floor space in proportion to the workers, but on account of storing of stock which is

bulky, and the few workers grouping together, it is as bad as working in a confined space.

Seven plants were visited where vehicles were made.

Plant, No. 1. This is a large plant making carriages and automobile bodies. The floors of the various buildings were large, light and airy, with but few workers on each floor. No special washing facilities; and meals are eaten in the factory. No cases of plumbism could be found. It was difficult to secure information from the workers. Samples of air taken in the room showed no lead present, but a sample taken at the breathing level of one worker who was leisurely sandpapering a wheel showed 2.2 milligrams of lead per cubic metre of air, proving the dangerous nature of the work. A great many of the workers were anaemic and if every one could be given a strict physical examination, plumbism would probably be found to exist in many.

. At quitting time, the alkaline sodium sulphide solution was applied to the hands of twenty workers who had washed up preparatory to going home. Fifteen showed the presence of lead still on the hands, proving uncleanness, one of the causes of poisoning.

There seemed a disposition on the part of the workers to regard very lightly the dangers incidental to the use of lead, and, as a rule, most of them used tobacco for smoking and chewing.

Plant, No. 2. This is a small place devoted principally to repair work. Four men are employed. No sandpapering was being done at time of visit. Washing facilities consisted of a sink and cold water. All the workers chewed tobacco, and were careless in their habits. No history of any symptoms could be obtained, though two of the workers looked as if the anaemia was due to lead.

Plant, No. 3. This was formerly a large carriage factory, but now makes automobile bodies. The building is large and old fashioned, with poor light and badly ventilated, but the workers are few. No sandpapering was being done. No special washing facilities are provided, and the head of the firm sees no danger from lead. Meals are eaten in the shop. It was claimed that in 40 years only one case had occurred in the place.

Of the six men employed, two could be classed as leaded.

One worker had been nine years at outdoor work and one indoors. He was markedly anaemic, but claimed to have no symp-

toms, and there was no gum line. He chewed tobacco but was clean as to person.

One worker, 25 years of age, had been a painter for eight years. He gave no history and had no gum line. Examination showed him to be tubercular, and in my opinion leaded.

Plant, No. 4. Ten men are employed in this plant and in place of lead priming, a rub filler, consisting of shellac, japan dryer, barium sulphate, silica, and linseed oil, is used. No dry rubbing is done, water and pumice being first used, then sandpaper. Hot and cold water is provided, and men furnish their own towels. Meals are eaten in the factory.

The workers are very clean as to habits, and no cases of plumbism could be found.

Plant, No. 5. This is a large carriage manufactory, employing 50 men. No special washing facilities other than hot and cold water furnished. Meals are eaten in the factory. The men are as a rule clean, but many use tobacco for chewing.

Two workers were seen who admit having been treated for lead poisoning a number of years ago, but claim that by being clean and careful they have had no return of symptoms. Other than slight anaemia, no signs of plumbism could be found. No cases were found among the other workers.

Another plant visited will be described under motor vehicles.

In the following plants there are a number of processes, each entirely separate from each other, but it is deemed advisable for the sake of clearness to describe each plant in entirety, instead of each process separately.

Printing and Lithographing:

One of the largest lithographing firms in the State was visited and studied. The building was a modern structure with all sanitary conveniences. The Departments taken up were color mixing, bronzing, pressroom, stone cleaning.

The plant was ventilated by means of a plenum system, and ample washing facilities, hot and cold water; soap and towels were furnished. The plant was kept very clean.

Bronzing. This was a large, light room, partitioned off the pressroom. All machines were entirely inclosed and connected with an exhaust system. One man cleaned up all dust with a

vacuum cleaner. Despite these precautions the room and the clothes of the men were covered with the bronze powder.

In Dr. Collis's report on bronzing, there seemed to be an opinion that lead poisoning from bronze powder is almost nil, and the amount of lead found in the samples of bronze powder submitted to the Government chemist contained but slight traces of lead.

This seems to bear out our own investigation. In a number of samples of bronze powder analyzed no lead was found present, and no cases of plumbism could be found among the workers.

Pressroom. During the lithographing, the pressmen get color on their hands and clothes, and, as the colors contain lead, there is some danger. None of the workers examined showed any symptoms of plumbism, but this may be due to the fact that they were cleanly in their habits. Twenty workers were tested after washing up, and no lead was found present on the hands.

Stone Cleaning. In order to use the lithographing stones again the color is washed off with benzine, the design ground off and the stone dressed. The workers engaged at these processes were all found to be very robust and exhibited no symptoms of plumbism.

Color Mixing. This was done in a large, light room. There were two grinding machines, and one pony mixer which was entirely inclosed.

One man did the color mixing and had been there a number of years. He gave a history of symptoms which indicated plumbism, and upon my advice decided to see a physician.

In order to determine to what extent the mixer was exposed, an analysis of wash water was made. The color mixer had been mixing chrome colors all morning, and at noon he wiped his hands as clean as possible with cotton cloth, and then washed them with soap and water. An analysis of the water in which he had washed showed 3.74 milligrams of lead carbonate, a further proof of the part personal hygiene plays in plumbism.

Printing:

Two daily newspapers were visited.

Daily, No. 1. Composing Room. This was on the top floor of an old building poorly ventilated. There were 21 linotype machines. On thirteen the pots were piped to a chimney, and on eight the pots were piped to an exhaust fan in the stereotype

room. All connections were poorly made. The floor is kept clean. Analyses of air showed no lead present. Of the 40 workers, none gave any evidences of plumbism. The foreman had been many years in the business and for years had set type by hand. He was gradually losing his sight and could not account for it. In my opinion, he was really suffering from the results of being leaded.

Stereotyping. This is a portion of the composing room. There are two metal pots heated by coal. Over the pots are collapsible hoods piped to a 24" exhaust fan in the window. Analyses failed to show any lead present in the air. There were 5 workers, all robust, and no evidences of plumbism could be found.

Daily, No. 2. Composing Room. This was on the second floor of what had evidently been a former dwelling. The room was 70' x 25' x 12' high, and contained seven linotypes the pots of which were piped to the periphery of a 30" exhaust fan in window. The room is entirely unfitted for such purpose. No lead was found in the air, and no cases of plumbism were found.

Stereotyping. This was in the rear of the first floor and connects with pressroom. There is a sort of shaft extending 20' upward from the ceiling and capped with a skylight having louvre windows. The place is not clean, and the one metal pot is hooded. No lead was found present in the air. The four workers were very robust, and showed no signs of plumbism.

This bears out the result of former investigation by the Department to the effect that the danger from fumes from metal pots are not very grave. The danger is from the oxides floating around as dust, and the dust from lead allowed to accumulate on the floor.

In order to determine the danger incidental to job or hand type setting, the worker on one paper washed up after setting type all morning, and an analysis of the water showed 1.30 milligrams of lead present. This is proof of the danger in handling material containing lead, and the necessity for perfect cleanliness in order to avoid taking it into the system.

Storage Batteries (Electric Accumulators.):

According to the Department returns, out of 67 cases of lead poisoning reported among indoor workers (23 of painters), 15 occurred among storage battery workers, which would seem to indicate the industry as a very dangerous one.

Storage batteries are made as follows:

First the grid is cast out of lead, it may be solid or have small perforations. If cast solid it is put through a machine to swage or roughen by finely scored lines. The grids are thoroughly cleaned of oil by means of benzine and are ready for pasting. The grids are used for the positives, and the sponge lead for the negatives. The grids are now smoothly covered with a paste containing a lead compound and sulphuric acid. They are then placed in tanks of sulphuric acid for 48 hours to form. The plates are again cleaned, burned off, and arranged in series. The smaller posts and connections are soldered in and the batteries made up in different sizes as required. There are different types of batteries and the process varies somewhat with each type.

Plant, No. 1. This is a large concern making a modification of the Planté cell, and also the paste type.

Casting Room. This is an open room 60' x 25' x 14', there are six lead pots with no hoods or exhaust system. Of the twenty workers, ten are young boys engaged in trimming the lead grids. Gloves are worn during the process, but the place is dirty. Analyses of the air of this room showed 3.4 milligrams of lead per cubic metre of air.

Pasting Room. This is just off the casting room. Despite the fact that the tables on which grids are pasted have an exhaust attachment, the room is not clean. There are seventeen employees who wear gloves furnished by the firm. Little attention is given by the workers to whether the gloves are in good repair. Where attention was called to gloves in bad shape, and new pairs were given out, the workers started to put their dirty hands in the new gloves, illustrating how little attention is paid to personal hygiene.

Analyses of air in this room showed 4.2 milligrams of lead per cubic metre of air.

Assembling. This is a room 60' x 50' x 30'. Ventilation is by natural means. Here the plates are burned off by means of a small bunsen torch, and then soldered together in series, or groups, and placed in sealed cells. There are only a few workers at each branch of the work, and they sometimes alternate. No gloves are worn, and there are no special devices for removing dust or fumes. A sample of air taken at lead burning bench during work showed

2.6 milligrams of lead per cubic metre of air, emphasizing the need of an exhaust system. The tables are dampened several times during the day, and the floors cleaned, but this does not remove the danger.

Hot and cold water, soap and towels are provided for men in lead processes, and cathartic pills are furnished free. The hands of ten workers who handled the pasted grids were examined after they had washed up, and lead was found present on all.

Three cases of poisoning occurring in this plant were reported to the Department. During the visit the following cases were found.

Casting. Three of the boys engaged in trimming grids showed typical anaemia, but as they could speak no English, further information could not be secured. They were all under 18, and had been working several months.

Pasting. Information was hard to secure, as workers spoke little English. One case worked three months. Anaemic, marked line on gums. Polish worker, no history could be obtained. Anaemic, line on gums. Four cases were seen with marked pallor, but no history could be obtained.

Polish worker being treated by a physician for lead poisoning but still continuing at work.

Assembling. Two lead burners reported to the Department showed marked symptoms and still continued at same work.

One lead burner, employed ten years, gave no history, but had well marked anaemia and gum indications.

In a small room off the pasting room the weighing and mixing is done. No means are taken to keep down the dust, and the worker is a Pole who understands no English, and showed evidences of plumbism.

General conditions in this plant need remedying. There is need for measures to take care of dust and fumes. The workers should also be informed of the danger of poisoning.

Plant, No. 2. This is a large plant making Planté and paste batteries. Each department is in a separate building.

Casting. This is a large, light building with mechanical means for ventilation. All metal pots are hooded, and men wear respirators and gloves. Despite these precautions, an analysis of the air

at the pots showed 1.0 milligram of lead per cubic metre of air, probably due to oxides formed on cooling of metal, or carried in by workers coming from the pasting department.

Pasting Room. This is a large, light room, and pasting is done on tables provided with an exhaust. Twenty workers are employed, mostly foreigners who speak no English.

The men are furnished gloves, but they are of little protection as the workers take them off, handle the lead with bare hands, and then put the dirty hands back into the gloves. Despite the exhaust system, the workers slop the paste over the floor and on the benches. The air analyses showed 1.2 milligrams of lead per cubic metre of air. The foreman said it was hard to get them to keep clean, and despite orders against eating, they would bring in sandwiches and eat them with dirty hands. As an example of uncleanness, the condition of the drinking water cooler was proof. Upon taking off the cover, red lead was seen on top of the water, so it was no wonder the workers were poisoned.

Just off the pasting room was the weighing room. Here every precaution was being taken. In every process where the dry lead was handled, such as weighing and mixing, it was done under a hood connected with an exhaust. The workers wore gloves and respirators, and were careful in all their methods of handling the lead compounds.

Forming Rooms. These are in separate building, light and airy, but no special means for removing acid fumes from tanks. Workers wear rubber gloves. There are never more than five men at work in the rooms.

Assembling. This is a large, light building. There are only eight workers on assembling.

Burning Off Room. This is a large light room. Ten men are engaged in burning, and ten in soldering. A machine for group soldering has been installed and is equipped with an exhaust system; this does much to lessen the danger. The men are not as careful as they might be in these departments, though means for protection are furnished by firm who endeavor to keep the rooms free from dust. An analysis of the air at the burning off benches showed 1.8 grams of lead per cubic metre of air. This is conclusive that there is danger attending this process.

The firm endeavors to protect the workers as far as it is possible for them to do so. Wash rooms with hot and cold water and soap powder are provided, and workers are allowed fifteen minutes to wash up in. Tests of workers who merely used soap showed that lead was not all removed, whereas those who used the washing powder showed no lead. Gloves and respirators are furnished, but in many cases are not used.

Despite all the precautions taken in this plant, there were thirteen cases reported to the Department as occurring among its employees. Most of these cases were found to be among the pasters.

During the visit, four cases were seen in the pasting room, and a greater part of the workers looked suspicious.

One case was found in the assembling room.

One case was found in the burning off room.

One case was found in the forming room.

I am of the opinion that in this plant the many cases are due to faulty personal hygiene, and emphasizes the fact that the workers must be educated, and warned of the danger.

The greatest danger seems to be in the weighing of the ingredients, and the pasting of the grids, due to the large quantities of dust containing lead oxides. There is less danger in handling the negative plates which contain lead sulphate and are hard. The positive plates are composed of lead oxide.

There is no doubt of the dangerous nature of the storage battery industry, and the need for measures applicable not only to the industry, but also to the employees, is fully emphasized.

Electrical Equipments:

Plant, No. 1. This firm makes various electrical supplies, and comprises a lead cable department, a brass foundry, and numerous assembling departments. The departments where lead is used are as follows:

Brass Foundry. This is in a large, light building, 50' x 60' x 25' high, the roof being a Texas with louvre windows. There are 9 crucibles, the tops of which are flush with the floor. The lead used does not go over 5%. Seventeen workers are employed. The caster had been at this sort of work for seven years and gave no history of plumbism, but showed a faint line in the gums. In my opinion he had some lead absorption. No other cases were

found. There were no special provisions for washing other than hot and cold water, and meals were eaten in the foundry.

Cable Department. This was in a room 100' x 300' x 12' high. There are three machines, the metal pots of which are not hooded. Eight men are employed, and none wear gloves which are furnished by the company. Meals are eaten in this room.

No lead was found upon analyses of the air, due probably to the enormous air space, and but one machine working.

Pocket Lamp Battery Department. In this room some hand soldering is done by females, and lead foil used in making batteries is handled by girls. No work was being done at time of visit.

The general conditions of this plant are fair, but no special precautions are taken to guard against lead poisoning. One case was reported to the Department as occurring in a cable worker in this plant. This worker was not seen, but there was seen another case in this department. He was anaemic, and the gum indications were marked.

Plant, No. 2. This plant makes cables, and has a rubber department and a lead department.

Rubber Department:

Weighing Room. This is a large room with a balcony for reaching the hoppers of the mills. The mills are enclosed, but there are no special means for dealing with the dust created in handling the dry materials used. The room is quite dusty, and but one worker was seen wearing a respirator. An analysis of the air of this room showed 1.0 milligram of lead per cubic metre of air.

Incorporating Room. This is a long room off the cable room. There are 4 rubber washers, and 6 incorporating machines, which are merely sets of revolving rollers set close together. There are no special means for handling the dust created during process of feeding the incorporators. There is a muslin hood over the top of each machine, but this is to prevent dirt getting into the rubber mixture. The floor is kept clean, but an analysis of the air showed 2.9 milligrams of lead per cubic metre of air. None of the workers wore respirators or gloves.

Lead Cable. This is in the main building which is spacious. There is one lead cable machine, the metal pot of which has no

hood. There are eight men employed. Very little attention is paid to their personal appearance, and in handling the lead, gloves are seldom worn. No lead was found in the air.

The company furnish no means for safeguarding the workers against lead, and washing facilities are merely running water. Many improvements are necessary to make the work safe.

One case of lead poisoning was reported to the Department as occurring in a worker at this plant.

Four cases were seen at time of visit.

One worker in the weighing room had gastro-intestinal trouble and showed signs of beginning nervous trouble.

Three workers at the incorporating rolls had typical lead anaemia, but gave no history of illness.

Plant, No. 3. This plant makes copper wire and has a rubber department. At time of visit alterations were being made in this portion of the plant. The principal danger in this place was confined to the weighing of the pigments and the mixing of the rubber. The weighing room was a small closet like room, and one American did all the weighing. No special means were used to keep down the dust, and no respirator was worn. The mixers were in the main room, but not provided with any exhaust system. It is intended to put this department in a separate building. No cases of plumbism were seen.

Plant, No. 4. This is one of the largest manufacturers of electrical goods in the world. The various departments are, in some instances, industries in themselves. Each department has its own building. The following departments were visited:

Brass Foundry:

This occupies a building 250' x 100' x 30' high, well lighted, and ventilated by natural means. 110 men are employed. There are seven crucibles arranged under a shaft leading to roof. Seven under a large hood with duct to roof, and two single crucibles, each with a hood and duct connection to roof. The amount of lead used in the brass varies from $\frac{1}{2}$ to 4%. Excellent wash rooms and lavatories were in the building, but no towels were furnished. No cases of plumbism were found, and the foreman had never heard of lead poisoning among the brass workers. Many admitted having had the "chills."

Cable Department. This was carried on in a building 200' x 100' x 30' high. There were four machines, the lead pots of which were not hooded. The workers wore gloves. No lead was found in the air, and no cases of plumbism were seen.

Rubber Work:

Weighing Room. This was a room partitioned off the main portion of the second floor. There were a number of grinders and mills, and a balcony for feeding bolting machines. There was no exhaust system for handling the dust, and on one side of the room two 30" exhaust fans were set in the window. The place was very dusty, and upon attention being called to the action of the fans in making conditions worse, they were stopped. In the mixtures used, as high as 70% litharge was used. An analysis of the air showed 6 milligrams of lead per cubic metre of air. Meals were eaten in this room.

Mixing. This was done on the first floor, the room measuring 300' x 100' x 14' high. There were 10 rolls or masticators, and are used for incorporating the pigment in the rubber. None of the machines have an exhaust system. Respirators are furnished but not worn, as it is claimed they irritate the face. One-half hour is allowed for meals, which are eaten in the same room. Workers do not wash up, claiming they have not sufficient time. Analyses showed 0.5 milligrams lead.

Seven cases were found in this department, all gave evidences of colic and muscular pain, were anaemic, and had the gum line.

It was strange that this department should be so lacking in safeguards, as in another department (described later), where machines of a similar character were in use, exhaust systems were installed.

Insulating Department. In this department some litharge was used. All mixers, masticators and calenders were equipped with hoods connected with an exhaust system. All weighing and handling was done under hoods.

In one of the buildings, hand soldering of small parts is carried on. There are ten pots hooded and connected to an 8" exhaust fan. Girls are employed at the soldering. No cases of plumbism were found.

The washing facilities in each building are splendid, but no towels are furnished. There is a small emergency hospital in the

plant with a nurse in constant attendance, but there is no regular attending physician.

A conference was held with the manager and heads of departments, which resulted in measures being at once taken to remedy faulty conditions.

Motor Vehicles:

This is a large plant and comprises a number of departments connected with machinery and vehicle manufacturing.

Foundry. This is a large, light, airy concrete building at the river front. 18 males are employed. Brass and aluminum are cast. It was admitted that lead was used in both mixtures. Lead was found in the air 2.58 milligrams per cubic metre.

Machine Shop. This occupies the floor of an old building and is divided into various lathe and turning operations. The aluminum metal is used for running boards and for gear cases. The foreman did not know there was any lead in it, and asked if lead was a poison. In one portion of the room were two workers casting babbitt bearings. Pots were not hooded.

Paint Shop. This includes portions of two floors and one small building, and is devoted to finishing automobile bodies. There were 40 men engaged in painting and sandpapering. None had been with this firm very many months. Most of the men chewed tobacco and were not very clean. Two admitted having suffered from plumbism, and one remarked that "if painters would keep clean they would not be leaded, as he had learned by his own experience."

Washing facilities are inadequate, and no special precautions were taken to insure cleanliness. Meals were eaten in all parts of the factory.

One case was reported to the department from this plant. He was a young foreigner and had been doing painting. When seen he was at work in the machine shop. The only symptoms he showed was slight anaemia, and had cramps once in a while.

In the paint shop ten of the workers had a typical lead pallor, and in the babbitt casting the two workers showed evidences of being leaded. Tests made on the hands of some of the painters showed they did not remove the lead by washing.

Conditions need remedying in this plant, especially in the processes where the workers are exposed to the action of lead.

A number of factories were visited where processes were carried on in which it was reputed there was danger from lead. Among these were musical instruments, making of colored cloth, artificial flowers, brush makers, hatters and lacemakers. But no evidence could be found in support of this theory.

CONCLUSIONS.

The result of the investigation has brought forth a number of important facts, many of which confirm the findings of previous investigators, and emphasizes the need for further scientific investigation.

That danger exists in many industries is clearly proven. In many instances the proprietors themselves are unaware of the presence of lead in the material used, or the danger therefrom.

It has been shown that in some industries other ingredients have been substituted in the place of lead.

It is apparent that medical supervision is necessary for workers exposed to lead and its compounds.

There are certain industries more dangerous than others, and for these, special regulations are necessary, such are white lead works, colors, paints and varnishes, potteries, storage battery works, smelting and making of alloys, solderings, rubber goods.

Lead poisoning can be prevented by proper removal of all dust, fumes, gases and vapors, and by cleanliness on the part of the worker.

It is clearly shown that many of the workers do not make use of the means provided for their protection.

There is necessity for an active campaign of education not only among the workers, but also among employers so that the danger and the remedies may become familiar to both.

RECOMMENDATIONS.

In the industries, a general law or regulation is not always practical, or capable of enforcement, for what may be just in one case would be unjust in another. It is recommended that the Labor Department be given authority to formulate special regulations for special industries using lead, modeled after the regula-

tions adopted by Great Britain and Germany. The Department should also possess the power to add to such rules new sections as may be required by changes in the industries or processes of manufacture.

The following industries are among those for which special rules should be formulated:

- Manufacture of white lead.
- Manufacture of dry colors.
- Manufacture of lead oxides.
- Manufacture of paints and varnish.
- Manufacture of storage batteries.
- Potteries and china makers.
- Smelting, making of alloys and plumbers' supplies.
- Manufacture of articles from metallic lead.
- Manufacture of rubber goods where lead is used.
- Painting of manufactured articles.

The following recommended regulations are merely general in character:

No female, or male minor under eighteen, should be permitted to handle any lead compound in dry or powdered form, or be employed in any process where dust containing lead compounds may be generated during the manufacturing process.

No worker should be employed in using lead without the possession of a medical certificate, and should have a periodical examination, at least once in six months.

Where large quantities of lead are used, the firm should have regular medical supervision.

Respirators, gloves, overalls and headcoverings should be furnished the workers, and the same cleansed or renewed at least once a week.

A dry room free from dust should be provided where the worker may hang such clothing as is not worn while at work. There should also be provided a separate place for keeping respirators, overalls and headcoverings used while at work.

Washing facilities consisting of hot and cold water, soap, nail brushes, and individual towels, should be furnished. There should be at least one tap or basin for every 5 workers.

No food or drink should be brought into any room where lead is used, and a special lunch room should be provided for the workers. Workers in lead should have a light warm meal before starting work in the morning.

The use of tobacco in any form should be prohibited during working hours.

All dust, fumes, gases or vapors created, should be removed effectively at the point of origin, and in a direction away from the worker. This is best accomplished by an exhaust system.

When a worker is found suffering from plumbism, he or she should be provided with employment where no lead is used.

Notices shall be posted warning of the danger from the use of lead, and giving rules for prophylaxis. This should be printed in several languages.

A record should be kept of all cases of illness, the record book to be readily available for inspection by officers of the Labor Department.

Time should be given the workers to wash up in, and at least one hour should be allowed for meals.

All workrooms should be thoroughly cleaned up by a wet process at least once a day, and, where the dust is hard to handle, should be dampened down several times during the day.

In order to prevent plumbism, it is necessary for the worker to realize that he or she must obey certain necessary rules of hygiene, otherwise regulations merely obeyed by the industries are entirely in vain.

Workers should realize that cleanliness is all important, and use should be made of the facilities furnished.

No food or drink should be brought into the factory, and no meals should be eaten in any room but the lunch room. Tobacco in any form should not be used during working hours.

The measures supplied for protection during work should be used and taken care of, and no apparatus for removal of dust or fumes should be interfered with or rendered useless.

Workers should submit to proper medical examination, and upon the first sign of illness, report at once to the physician.

Workers suffering from plumbism should not return to any work which exposes them still further to lead.

Care should be taken by workers so that other workers may not be exposed to the danger of poisoning through their carelessness in handling material, or in matters of personal hygiene.

ARSENIC POISONING.

Arsenic, meaning literally male arsen (from the notion of the alchemists that metals were of different sexes), was known to the early Greeks. Aristotle gave it the name of "sandarakā," and Theophrastus mentions it as "arsenikon." These substances were undoubtedly sulphides of arsenic. Olympiodorus, a Greek alchemist, obtained the oxide or white arsenic by roasting arsenic sulphide, and in the arts of the ancients these substances were used to impart a white color to copper.

Arsenic is found as an impurity with many of the minerals, but the more common ores are realgar, orpiment, arsenic pyrites or mispickel, and arsenolite. No arsenic is mined in the United States. Some 6,000,000 pounds of arsenic are imported annually, mainly from England and Germany.

CHEMISTRY.

Arsenic is a brittle, steel gray solid; upon being freshly broken it has a metallic lustre which disappears slowly in a moist atmosphere. Heated in the air it volatilizes without melting at temperatures above 212° F.— 100° C., and rapidly vaporizes at a dull red heat. The vapor is of a golden yellow color and has an odor of garlic.

There are many compounds of arsenic, but in the industries it is necessary to notice the following:

Arsenious oxide or arsenic trioxide is the most important, and is often called "arsenic" or "white arsenic." There are two common varieties, a white, granular powder and an amorphous, glass-like solid. It has no odor, but has a faint metallic taste.

Scheele's green or Paris green, is a hydrocupric arsenite, containing 52.8% of arsenious anhydride.

Schweinfurt green, Vienna green, emerald green, is a cupric arsenite and acetate, containing 58.4% of arsenious acid.

Orpiment, or Arsenic trisulphide, contains 60.98% arsenic, is crystalline, and of a brilliant color. For industrial purposes it is

prepared artificially by subliming one part of sulphur with two parts of arsenic trioxide. The resulting product varies in color from yellow to red according to the relative quantities of the ingredients used.

Realgar, arsenic sulphide, contains 70.01% of arsenic. The commercial product averages 75% of arsenic.

Realgar is found native in ruby red crystals, and is also found at times associated with lead. It is prepared artificially for the industries by heating together nine parts of arsenic and four parts of sulphur, or, one hundred and ninety-eight parts of arsenious anhydride with one hundred and twelve parts of sulphur.

Arseniuretted hydrogen, arsine, is a colorless inflammable gas of fetid, garlicky odor. One litre contains 95.69% arsenic. Oxygen or air and arseniuretted hydrogen, make an explosive mixture. Chlorine decomposes the gas with great energy, combining with the hydrogen and setting free arsenic as a brown cloud, any excess of the chlorine combines with the arsenic as a chloride.

For many years the ordinary and best known qualitative test for arsenic has been the simple one known as Marsh's test, but, as antimony gives the same result as arsenic, the test is not reliable unless carried out very finely.

In atmospheric analyses where minute quantities of arsenic may be present, and a quantitative analyses is necessary, it is of importance that the method adopted be of extreme accuracy. In this connection the following method was pursued:

In all cases one thousand litres of air was aspirated through a battery of specially constructed gas-wash bottles, containing doubly distilled water. After securing the sample, nitric acid and sulphuric acid are added to the water to convert into a soluble form such arsenic as may be present. The solution is then evaporated until fumes of sulphuric acid come off. The mass is now transferred to a small florence flask which has a tube bent at double right angles leading into a high gas-wash bottle containing distilled water. To the contents of the flask is added one gram of ferrous sulphate. Heat is applied to the flask and hydrochloric acid run in. The acid is run in through a thistle-tube fitted with a stop cock. Chloride of arsenic forms in the presence of arsenic, which is soluble in the water contained in the gas-wash bottles. After completing the operation of the formation of arsenic

chloride, and no more will distill, the gaseous residue remaining in the apparatus is aspirated through a watery solution. In order to guard against outside atmospheric contamination and prevent collapse of the flask with a liability of sucking back of the liquid into the flask, a small check valve was placed on the flask. The chloride of arsenic collected in the large gas-wash bottle is now treated with sulphuretted hydrogen and a stream of carbon dioxide passed through the solution to dispel any sulphuretted hydrogen which may remain in excess. The resulting precipitate of arsenic sulphide is now collected upon an accurately weighed filter paper, and the result calculated.

In the analyses of dust, solutions and materials, use was made of the many accurate methods described in the textbooks on chemistry, those in Prescott and Johnson being given preference.

TOXICOLOGY.

Blyth, an eminent English authority, in an early edition of his work on poisons, states that "arsenic causes so many deaths both in man and cattle, that it comes under the notice of the chemist more frequently than any other poison."

In the list of industrial poisons prepared by a Committee for the International Association for Labor Legislation the following preparations of arsenic are found:

Arsenic, white arsenic, arsenious acid.

Arsenic acid. Arseniuretted hydrogen.

Orpiment. Realgar or Ruby sulphur.

Cochineal or Vienna Red.

Aceto-arsenite of copper (Schweinfurt, Vienna, or Emerald green).

Arsenite of copper (Scheele's green or Paris green).

Of these, white arsenic and arseniuretted hydrogen are extremely dangerous. Small doses, as 2 or 3 grains of the white arsenic, being oftentimes fatal.

Absorption of the poison into the system may occur in one of the following ways:

Through the alimentary canal (stomach and intestines).

Through the respiratory tract (lungs, etc.).

Through the mucous membranes of the nose and throat.

Through the skin.

In considering arsenic poisoning generally, we may do so under three forms: Acute, chronic, and a form limited to purely local lesions.

In acute arsenical poisoning, such as results from accident, suicide, or homicide, the arsenic enters the system through the alimentary tract, but in cases of industrial poisoning this occurs only where the workers take their meals into workrooms containing quantities of arsenic, especially in the form of dust, or fail to wash their hands and face properly, either before eating, or upon completing the day's work and leaving for home.

In acute poisoning the following symptoms usually occur within a short time after exposure:

Intense epigastric pain, a metallic taste in the mouth, and, at times, salivation. There is intense thirst, colic, diarrhoea, and suppression of urine, or bloody urine. The heart action is feeble, and there may be palpitation. There may be cough and oppressed breathing, oedema (swelling) of the eyelids or general oedema. Some cases exhibit no gastro-intestinal symptoms, but suffer a sudden collapse, passing into a coma resembling a narcotic poisoning, or exhibit symptoms resembling cholera.

Arsenic may be gradually absorbed into the system in very small quantities covering a long space of time, and is capable of being stored in the body, especially in the tissues of the brain, spinal cord and the liver, resulting in chronic arsenic poisoning, the poison as a rule entering the system through the respiratory tract and mucous membranes as a result of exposure to arsenic dust or fumes.

The usual symptoms of chronic arsenic poisoning are debility, anaemia, and urticaria (skin rash). There may be diarrhoea, or a mucous discharge from the bowels which is considered by Dr. Lloyd as a significant sign. There may be redness or even bleeding from the gums. Multiple neuritis and paralysis may often develop as a later result, resembling to a great extent the results of lead poisoning. Where the individual is exposed to the effects of both lead and arsenic there is liability of a wrong diagnosis. The following are points for differential diagnosis:

Lead. Paralysis confined to the extensor muscles of the wrist and first phalanges. Pure motor paralysis is seldom present. Sensory disturbances are slight or usually absent.

Arsenic. Paralysis may attack wrist, more often involves the corresponding muscular groups of the lower extremities, and often involves the muscles of the thigh and upper arm. Pure motor paralysis is always present. Sensory disturbances are marked. Rapid wasting occurs and the atrophied muscles present the reaction of degeneration. At times the extensor and peroneal muscles are involved causing a gait termed by Dr. Butler, "the steppage gait." In arsenical poisoning there is oftentimes a fine tremor present resembling that caused by lead, mercury and alcohol. The local form results as a rule from the action of dust containing arsenic upon the skin and mucous membranes. In the presence of moisture the arsenical compounds are very irritating and possess caustic properties. The points of attack are usually the hands, forehead, neck and genitals, parts of the body usually moist from perspiration.

The lesions usually appear with greatest severity upon the hands, as those members are constantly wet from contact with solutions, and come in closer contact with the toxic material through continual handling.

In the nose the mucous membrane becomes highly inflamed, there is excessive coryza. In serious cases there is a perforation of the septum (the cartilage partition between the nostrils), and termed rhinitis perforans.

The local lesion may first appear as a slight eczema, the eruption soon becoming pustular, and if neglected are very apt to develop into painful ulcers.

Many dermatologists (Kirchgasser, Lepine, Beaugrand) have described a brown pigmentation of the skin as typical of arsenic poisoning. Sir Thomas Oliver calls attention to the fact that arsenic has the effect in some people of predisposing to cancer. Hutchinson believes that its absorption in the system over a long period may cause epithelioma.

Arsenic is eliminated rapidly through the kidneys and the skin, but is attended with marked irritation, as is manifested by nephritis (kidney disease) and skin eruptions.

It has been demonstrated by Prof. Brouardel that the milk of nursing mothers will absorb arsenic that may be in the system, and that it may take as long as forty days to eliminate one dose.

Prof. White states that arsenic passes from the mother to the foetus. This would indicate that a grave danger exists both to mother and child in exposing women to the effect of arsenic.

At the International Congress of Hygiene held in Paris in 1880, a report on arsenic poisoning in the trades was presented by Gubler and Napias. In the report was a tabulation of industries using arsenic in some form, and are as follows:

- Workers on lead frames.
- Workers on colored paper.
- Color grinders.
- Foundry workers.
- Wire drawers.
- Printers.
- Paper glazers.
- Paper cutters.
- Makers of velvet.
- Cloth dressers.
- Dyers.
- Cloth printers.
- Painters (outdoor).
- Color makers.
- Painters and decorators.
- Artificial flower makers.
- Artificial foliage makers.
- Makers of green lamp shades.
- Leather curriers.
- Dressmakers.
- Aniline workers.
- Smelters of mineral arsenic.
- Makers of arsenious acid.

In 1892 Dr. Layet of Paris prepared the following table of 27 trades or professions wherein the workers were exposed to the danger of arsenic poisoning:

Workers employed in the preparation of arsenic and arsenious acid.

Workers employed in the smelting of tin and pewter.

Workers employed in the smelting of cobalt.

Founders of copper.

Founders of zinc.

Workers in the aniline industry.

Manufacture of iron sulphate by the action of sulphuric acid on old iron.

Chemists.

Arsenical color works.

Manufacture of colored paper.

Manufacture of artificial leaves and foliage.

Aeronauts.

Inflaters of toy balloons.

Bronzers of metal.

Manufacture of vault lights (glass).

Colorers and curriers of leather.

Tinters and dressers of cloth.

Tanners.

Taxidermists.

Manufacture of artificial stones.

Jewellers.

Manufacture of glass and crystal.

Drawing of zinc wire.

Hatters.

Manufacture of colored crayons.

Manufacture of artificial soda (salt wort).

Manufacture of glucose.

Reference to the numerous works on industrial diseases, industrial hygiene, forensic (legal) medicine, and chemistry, shows the following occupations listed under those wherein there is danger to the worker from arsenic poisoning:

Furriers.

Manufacture of candles and wax ornaments.

Manufacture of japanned goods.

Manufacture of carpets.

Fancy bookbinding.

Preservation of wood.

Manufacture of gloves.

Manufacture of sheep dip.

Electroplating.

Lithographing and bronzing.
 Manufacture of artificial leather.
 Manufacture of oilcloth and linoleum.
 Manufacture of cut glass.
 Manufacture of hat linings.
 Manufacture of beer.
 Soaking of silk cocoon.
 Enamelling.

This presents rather a large list of occupations and would seem to confirm the statement of Blyth's. Notwithstanding the danger from arsenic poisoning in the industries, the literature on the subject is rather meagre, and the special investigations undertaken are rather disappointing in their reports. A splendid report is that of the Commission appointed by the Department of Commerce and Industries of France, but it is over twenty years since they completed their labors.

Processes of manufacture have, since then, undergone successive changes, due to improvement in machinery, and the advancement made in the science of industrial chemistry, whereby harmless substitutes have replaced the arsenic preparations.

In the report of Dr. Legge (H. M. Medical Inspector of Factories in Great Britain) for 1900, there are reported seven cases of poisoning in color works, and thirteen cases from arseniuretted hydrogen, while in his report for 1910, there are only reported two cases in color works, and two cases in arsenic refining.

During the first year of reporting in this State there were reported two cases in color workers, one case in paint works, and one case in a tanner.

This would indicate that the danger is limited to a very few industries, but in order to secure confirmatory proof, an endeavor was made to get at least some information in regards to the occupations mentioned in the foregoing tables.

The following cases of arsenic poisoning cited by various observers are of interest, and emphasizes the need for intensive investigations of industries for the purpose of discovering the use of poisonous materials:

Blyth reports a case of poisoning from inhaling the fumes from arsenical candles.

Sajou cites (from the N. Y. Medical Record, March 30, 1889) cases of arsenical poisoning in children attending a Christmas party. The symptoms were finally traced to the burning of candles containing Scheele's green.

Inquiries were pursued into this subject, and it was ascertained that arsenic was not used in candles, the aniline colors and chromes (lead) being used. Some colored candles were secured and analyzed, but no arsenic was found.

Hehne reports the occurrence of arsenic poisoning among a number of workers in an English brewery, and the symptoms were traced to the use of glucose made with contaminated sulphuric acid. Dr. Reynolds of Manchester found as high as 2.6% of arsenic in the acid, and as high as four grains per pound in the glucose. Analyses of the beer showed a large percentage of arsenic, and it estimated that 6,000 persons suffered poisoning, 70 with fatal results. It was also found that the malt dried in English malt kilns was contaminated with arsenic, resulting from the use of coal. It is asserted that all coal contains pyrites, and this mineral is again contaminated with arsenic. Glucose, it must be remembered, is used in the manufacture of a large number of food products.

During our investigation we were unfortunately unable to study this subject.

Dr. Legge reports the following cases:

A worker engaged in putting copper tubes in a muffle furnace.

A case of arseniuretted hydrogen occurring in a worker employed at galvanizing iron.

A number of cases in chemical works.

Several cases in a copper recovering plant.

A case of a mixer of dehairing solution in a tannery.

The following extract is from an article by Murrell and Hale, British Medical Journal, July 11, 1896:

A preliminary report as to the presence of arsenic in cigarette wrappers: Out of seventeen series of different kinds of cigarettes and tobacco, arsenic was present in the labels of six, or more than a third. The arsenic in these cases was present in such large quantities that no difficulty was experienced in demonstrating the fact. Suggestion that, as the inhalation of arseni-

ous acid, even in minute quantities for a considerable time produces cough, hæmoptysis, expectoration and loss of flesh, which are readily mistaken for phthisis, the advantage of accurate knowledge concerning this subject is most apparent.

The cigarette paper of six brands manufactured in this State were analyzed and no arsenic found, but this investigation was not sufficiently extensive to render a definite decision.

Murrell states that arsenic is used in the binding of books, and that the dust which collects on the top of bookcases in libraries contains considerable quantities of arsenic.

Inquiries among bookbinders failed to confirm this statement, and analyses of a number of samples of dust taken from the books and bookcases in the chemical library of the University of Rochester failed to show any arsenic present.

INDUSTRIES.

In pursuing the investigation, the industries were grouped under the following headings:

Industries wherein arsenic or compounds of arsenic are manufactured.

Industries wherein arsenic or preparations of arsenic are used in the process of manufacturing processes.

Industries wherein materials liable to be contaminated with arsenic are manufactured or used.

In many of the industries visited both lead and arsenic were reputed to be used, therefore the description of the plant has been incorporated in the report on lead poisoning.

There are a number of industries wherein arsenic is used, which are located in Greater New York, the same type of industry not being found in any other portion of the State, so that, while not included in the investigation, still it is deemed advisable to make some reference to them.

The following are industries visited wherein it is reputed that arsenic poisoning may occur:

Industries Wherein Arsenic and Its Compounds are Manufactured.

The mining or extraction of arsenic is not carried on in this State, and the conclusions of the French Commission on Indus-

trial Poisons were, that poisoning among workers engaged in handling minerals containing arsenic, or engaged in extracting it, were rare. I was informed by the former manager of a large lead mine in the West, that a number of cases of mixed poisoning (lead and arsenic) occurring among the miners had come under the observation of the company doctor.

Arsenic Colors:

There is but one plant outside of Greater New York engaged in this process, and at the time of our visit no work was being carried on in this portion of the plant. The factory is a small one situated in a small village near the river, the products are paints, vermin exterminator for plants and arsenic greens. In the vermin exterminator, two per cent arsenious acid is used.

The building used for the arsenic color is about fifty feet square, and consists of two stories. Five males are employed. The first floor is devoted to manufacturing, bolting and packing. No means are in use for dust extraction, and no respirators are furnished or worn. The second floor is devoted to the mixing mills and is very dusty. No provision is made for keeping down the dust or exhausting it. No samples were taken for analyses as the arsenic processes were not in operation.

One worker was examined, he had been employed for thirty-two years and showed no symptoms, and gave no history of ever having had arsenic poisoning.

Workers in arsenic color are extremely liable to arsenic poisoning, exhibiting itself in skin eruptions, especially upon the hands, termed, "arsenic pock," and by some French writers as "rossignol," or "Cholera des doigts." During visits paid to the color works located in Greater New York the cases of poisoning seen by me showed a rash on both the hands and face. The irritant action of arsenic dust was fully demonstrated in the case of Inspector Vogt and myself. After spending several days exposed to the dust, the mucous membranes of our noses were inflamed for some time afterwards. An analysis of air from one of the packing rooms showed .303 Grams of paris green per cubic

meter of air, and further analyses showed that of this, .093 Grams was arsenic.

Dr. Collis reports the finding of several cases of perforation of the septum of the nose, this I have not seen, and Dr. Legge also reports that he has not seen such cases.

In this industry the danger is from the dust, especially in the processes of drying, bolting and packing.

Aniline Works:

There is but one aniline works outside of Greater New York, and is situated in the open near the river. Upon inquiry it was ascertained that arsenic had not been used for many years, and both the manager and chief chemist rendered every assistance to prove the truth of the statement.

By some writers it was reputed that the danger existed in the preparation of rosaniline. This could not be verified.

Industries Wherein Arsenic or Preparations of Arsenic are Used. Colored and Glazed Papers:

Three large factories of this industry were visited, all were located in the open country, and, owing to the necessity of large space for drying purposes, the air space in proportion to the number of workers was enormous.

In this industry the danger was reputed to be due to the use of arsenic colors. Samples of the ingredients used were obtained and analyzed, but no arsenic was found. None of the workers examined showed any symptoms, and no histories could be obtained of any illness among the workers resembling arsenic poisoning. The superintendent of one factory, a Frenchman of many years' experience, informed me that many years ago arsenic poisoning did occur among the workers in this industry, but that within the last fifteen years the only ingredients used are aniline colors, barium, caseine and clay. The firm very kindly permitted us to examine book of supplies purchased, and this, together with the result of our analyses, confirmed the fact of no arsenic being used.

Paint Works:

Six paint factories were visited, three used arsenic colors but to a limited extent, the principal output being lead colors. At the time of the visits arsenic was not being used. No cases of poisoning were found among the workers, and all information as to whether there had ever been any cases was negative.

That there is danger cannot be doubted, for the reports of other countries, and the report of one case to the Department demonstrates the fact. The process wherein the danger lies is from the dust created in handling the dry arsenic color. In this industry there is danger of mixed poisoning, and the industry is described at greater length in the report on lead poisoning.

Rubber Goods:

Five plants were visited where rubber was used, in but one was arsenic used. This was a large plant situated in the open country, and manufacturing rubber goods exclusively. Very small quantities of arsenic were used, and that at great intervals for coloring purposes. At the time of our visit none was being used. The workers liable to poisoning were those engaged in compounding and at the mixing rolls. No cases of poisoning were found, and none were reported. Samples of ingredients being used at the time of our visit, as well as of the finished product, were secured and analyzed. No arsenic was found. A further description of the plant is included in the lead report.

Manufacture of Glass:

The French Commission reports that in the manufacture of glass, upon putting the mixture in the furnace a portion of the arsenious acid volatilized, and its odor was very appreciable. They cite the investigations of Boedker de Witten, made in 1862, which showed that only one-fifth of the arsenic remained in the mixture, four-fifths volatilizing, with the result that the fumes in the chimneys contained considerable arsenic. A further analysis of the fumes showed 0.425p.100 arsenious acid. The Commission finds that the danger is greater from the dust.

Six glass factories were visited, of these, two used arsenic for the purpose of producing a white or milky-colored glass. One factory visited is reputed to be one of the largest glass factories in the world. At this plant white arsenic is used in the proportion of one-half pound of arsenic to every twelve hundred and fifty pounds of other ingredients. In the process of mixing and of placing mixture in the furnaces, no conditions were observed as reported by the French Commission, but this may have been due to the result of modern methods in use at the plant.

The danger exists in the mixing room, due to the handling of the dry arsenic which is shoveled into the open mixing trough. The amount of arsenic placed in each batch is very small, and the total amount used during the year is only a few hundred pounds. The greatest danger is from lead poisoning, and for that reason the industry is considered more fully in the report on lead poisoning.

Analyses of samples of air taken during mixing, and in the furnace rooms failed to show the presence of arsenic.

As the workers who are directly exposed to the danger of poisoning were foreigners who understood very little English, it was difficult to obtain much information as to illness. None of the men exhibited any symptoms of arsenic poisoning, and it was asserted that there had never been any cases previously.

At the second plant visited, no mixing was being done at the time of our visit, and it was stated that no arsenic glass was being worked just then.

Samples of air were secured from the furnace room and the analyses failed to show any arsenic present. No cases of arsenic poisoning were found, and none were reported.

Electroplating:

Five plants were visited where electroplating was carried on extensively. It was ascertained that white arsenic was formerly used for the production of French gray (a form of oxidizing), bronzing and brass plating, but at present it was not used owing to improved methods. The opinions of the head platers inter-

viewed were all to the effect that the use of arsenic was unnecessary, and that they did not use it.

We were permitted to examine the list of supplies purchased and found no account of arsenic. Analyses of the solutions in use failed to show the presence of arsenic, and an examination of the workers failed to show any symptoms of poisoning. No cases were reported.

In two of the plants several assistant platers were questioned very closely, and they admitted that if over rushed with work requiring brass plating, they surreptitiously used small quantities of arsenic which they purchased themselves. The proportion of arsenic used was two ounces to one hundred gallons of solution. The largest amount ever used in one year was one hundred pounds. This was reported by a very large concern where it had formerly been used in the production of grays.

Wall Paper:

Poisoning from wall paper has been the subject of a great many writers and the cases cited are numerous. In the past many noted investigators have proven that danger did exist.

It was asserted that the action of certain moulds upon the arsenical organic matter in wall paper produced a volatile oil which rendered poisoning through the lungs possible.

One wall paper factory was visited, and it was ascertained that aniline colors alone were used, arsenic colors having been dispensed with as a result of the many cases of poisoning reported and its effect upon the sale of wall paper. No cases of poisoning among the workers were reported. Several samples of wall paper were analyzed but no arsenic was found.

Hayward and Warner report that of 537 samples of wall paper examined, 75% contained more than 0.1 grain of arsenic per square yard. Two of the samples came from England. Five samples contained less than 0.1 grain. Two were from England, one from France and one from Germany. Ninety per cent of the samples contained less than .046 grains per square yard.

Dr. Legge cites a case of poisoning from wall paper. An analysis of the paper showed it to contain ".004 of a milligram

of arsenic per gram of paper. Clean unused white foolscap paper has been found to yield a very higher proportion of arsenic."

This tends to show that at the present time, very little danger from poisoning exists in the wall paper industry.

Japanning:

This is a variety of varnishing used on leather, but mostly for cheap household utensils.

Three large plants were visited where japanning was carried on extensively. It was ascertained that at one time the arsenic colors were used in small quantities for producing delicate opaque colors, but had now been discarded. Analyses of the solutions used showed no traces of arsenic, and no cases of poisoning among the workers could be found.

Enamelled Ware:

One large plant making high grade enamelled ware for household purposes was visited. Analyses of ingredients used showed no arsenic to be present.

Dyeing, etc.:

Various writers have reported cases of poisoning from yarns and cloth goods as a result of using arsenic as a mordant.

In a case of reputed poisoning from embroidery yarn, Dr. Legge had Dr. Thorpe analyze several shades of green worsted used. Dr. Thorpe reported the yarns practically free from arsenic.

Two large woolen mills were visited, and the head dyers stated that arsenic was not used. Analyses of the dyeing solutions failed to show arsenic present.

One large carpet factory was visited. It was stated that only aniline colors were used, and that they used no preparation of arsenic. Analyses of solutions used failed to detect any arsenic.

One large plant was visited where plush and upholstery trimmings were manufactured. It was claimed only aniline colors were used. No arsenic was found in the dyes.

In none of these industries could any cases of arsenical poisoning be found, nor has any ever been called to my attention.

Artificial Leather. Oilcloth:

One large plant was visited where artificial leather was manufactured. It was admitted that arsenic colors (greens) were used, but in small quantities and at great intervals. At the time of our visit no material requiring the use of arsenic was being manufactured.

The danger is confined to the color mixing room. Here the workers handle the dry colors and are liable to poisoning through inhalation of the dust created.

No cases of arsenic poisoning were found among the workers, and there was no history of any poisoning among the workers at any time.

One large oilcloth plant was visited. The manager stated that no arsenic colors were used. No cases of arsenic poisoning were found, and no arsenic was found in the colors used.

Artificial Flowers and Foliage:

The danger in this industry was reputed to be from the use of the arsenic greens for the purpose of dyeing and dusting the material.

A number of factories were visited. It was stated that for many years past nothing but aniline colors had been used. A number of samples were secured, which upon being analyzed failed to show any traces of arsenic.

Tanning of Leather:

Dr. James G. Parker, an English authority on leather, states that in the process of tanning, realgar (arsenic sulphide) is used for the purpose of depilation (removing of hair from the hide). The realgar is slaked with the lime, and is used in the production of the finer light leather, such as glace kid and glove kid. This method produces a very smooth grain (the use of sodium sulphide tends to make the grain harsh and bold) and is, therefore, very suitable for the purpose, but it is very expensive.

In 1895 "Le Comite consultatif d'hygiene publique de France" reported that the solution for fine leathers contained 4 to 10 Kilos of orpiment to 400 Kilos of lime and 20 Hectolitres

of water. The irritant action of the orpiment resulted in "le cholera des doigts" (a skin affection of the fingers, resulting in painful ulcers). They further reported that there was danger in the handling of skins preserved by means of a solution of arsenious acid and sodium carbonate, these skins coming principally from Australia, Tasmania, New Zealand and the Platte.

Blyth states that tanners formerly employed a mixture of ninety parts orpiment and ten of quicklime, under the name of "Rusma," but the alkaline sulphides from gas works have replaced it.

Three large tanneries were visited. The head of one of the plants, a tanner of many years' experience and an authority on tanning, stated that for a great many years past, arsenic had not been used, as lime was much cheaper for the purpose of dehairing; besides, improved dehairing machinery had rendered the use of arsenic unnecessary. These statements were confirmed by all the tanners visited. Samples of the solution used in each plant were taken and analyzed. The results of the analyses showed no arsenic present.

A case of arsenic poisoning in a tanner was reported from a hospital in Greater New York, but upon investigation the patient could not be found, and the tannery where he worked had not been given.

From the results of our investigation, I am rather of the opinion that the case was not a true arsenic poisoning.

Taxidermy:

This art is limited to a few isolated individuals, and to the public museums of natural history, or in connection with college or university museums. While the workshops of taxidermists are not inspected by the Department, it was deemed advisable to include the subject in the investigation.

The danger in taxidermy is from the use of white arsenic. This is incorporated in the preserving soap, and consists usually of 40% white arsenic. The white arsenic is also used as a dusting powder on the inside of the specimen before stuffing.

Montagu Browne, an English authority, states that an efficient substitute may be used, consisting of soap, whiting, chloride of lime and musk.

Mr. Donovan, of the American Museum of Natural History, informed me that an alum mixture may be used in place of the arsenic powder. He stated that in his fifteen years' experience with arsenic he had never been poisoned, nor had he known of any cases, though in the hands of unskilled workers there is a danger.

Several taxidermists were visited and all admitted using arsenic, but denied ever having been poisoned. No cases have so far been brought to my attention.

Furriers:

Haywood and Warner report having examined 47 samples of fur to be used as articles of dress, of which 11 samples contained from 20 to 1,700 times as much arsenic as would be allowed by the Massachusetts laws, which limits the amount to .10 grains per square yard in papers and woven fabrics, and .01 grain per square yard in dress goods and articles of dress. It is presumed that this amount is added during the process of preparing the fur.

This subject was investigated shortly before undertaking the present investigation, and a full account will be found in the report of the Commissioner of Labor for the year 1912. The results of the investigation do not confirm the findings of Hayward and Warner, as no arsenic was found in any of the samples analyzed.

A number of furriers were visited during the course of the present investigation and they denied using any arsenic, stating that it was liable to ruin the fur.

No cases of poisoning were found among the fur workers, nor have any cases been brought to my notice.

Bronzing and Lithographing:

Dr. Collis, in a special report on bronzing, states that "bronzing powders consist of copper, zinc and aluminum, with small and negligible traces of tin, lead, arsenic and iron. Of ten sam-

ples of gold and bronze powder analyzed six contained slight traces of arsenic. Three silver and aluminum powders contained no arsenic, and six colored powders contained no arsenic, but did contain coal tar dyes. The analyses were made by Dr. Thorpe and Mr. Hooper of the Government Laboratory.

The question of arsenic poisoning is not discussed in the report, and the conclusions would seem to indicate that danger from arsenic poisoning does not exist.

Two large plants were visited and the bronzing departments carefully investigated. No cases of arsenic poisoning were found, and none were known of. Analyses made of a number of samples of bronzing powder failed to show the slightest trace of arsenic present.

Lithographing:

The danger in this process is reputed to result from the use of arsenic colors.

Two large plants were visited, no symptoms of arsenic poisoning were found among the workers, and analyses of the colors used failed to show the presence of arsenic.

In one plant a sample of the water in which the color mixer had washed his hands, after the morning's work, was carefully analyzed for traces of arsenic, but none was found.

These results tend to confirm the findings of the British investigation as to the absence of danger from arsenic poisoning in the processes of bronzing and lithographing.

Colored Crayons:

No factories were visited where crayons were made, but it was ascertained through inquiries that aniline colors alone were used. A number of colored crayons were secured and analyzed. In none of them was the slightest trace of arsenic found.

INDUSTRIES WHEREIN MATERIALS LIABLE TO BE CONTAMINATED WITH ARSENIC ARE MANUFACTURED OR USED.

Chemical Works:

In this industry Dr. Legge reports a number of cases poisoned through arseniuretted hydrogen gas, and attributes it to the use of impure acids. Several of the cases were fatal.

Visits were made to two chemical plants but little information could be obtained. It was denied that any cases of poisoning had occurred, and it was impossible to obtain any samples for analyses.

One plant manufacturing sulphuric acid was visited. At the time of the visit there was a leak in one of the pipes leading from the still, so the air was heavily charged with acid fumes. Analyses failed to show any arsenic present, and no cases of poisoning could be found, inquiries failed to show that the workers had ever shown any symptoms attributable to arsenic.

Copper and Brass Foundries:

In these industries the danger is attributed to the presence of arsenic in the copper used. During the process of melting the copper, fumes of arseniuretted hydrogen are generated. The workers most exposed to this danger are the casters or furnace tenders.

Three large copper plants and six plants with brass foundries were visited. Careful examination failed to show that any of the workers had suffered from arsenic poisoning. Samples were secured during the time of pouring off, and also from the fumes in the pots, but no traces of arsenic were discovered. This does not, however, prove that there is no danger, and in my opinion a much more intensive and wider investigation should be undertaken before rendering any decision.

Galvanizing:

In this industry the danger is attributed to the fumes of arseniuretted hydrogen due to the use of impure acid and zinc.

Four plants were visited. Analyses of the fumes from the galvanizing pots showed no arsenic present. Analyses of the hydrochloric acid used also failed to show any arsenic impurity present.

The majority of the help were all foreigners who understood very little English, and were not long at the work. Thus it was impossible to secure any definite information as to poisoning. While the results of our investigation would seem to indicate that no danger from arsenic poisoning exists, it is not conclusive, as at some time or other, despite all precautions, an impure acid might be used with fatal results.

CONCLUSIONS.

The results of the investigation may be summarized as follows:

Arsenic and its compounds are powerful poisons, and their use in the industries is attended with danger to the health of workers exposed to them.

Poisoning may occur accidentally through the use of material which, unknown to the worker, contains arsenic as an impurity.

Poisoning may occur through the handling of or exposure to the dust of arsenic or its compounds.

The form of poisoning most seen is that limited to local lesions of the exposed portions of the body (hands and face), and to the mucous membranes of the nose.

The greatest danger exists in industries devoted to the manufacture of Paris green and Vienna green.

Danger exists in the following industries: Paint works; plant vermin exterminator; glass works, other than bottle and window glass; artificial leather and oilcloth; electroplating; taxidermy; rubber goods, other than for insulating purposes.

In a number of industries there is danger of a mixed poisoning, which is liable to render a proper diagnosis difficult.

The majority of the workers are unaware of the poisonous nature of the material handled, and where precautions are taken it is only because lead compounds are also used.

The danger can be minimized by the removal of the dust or fumes at the point of origin and in a direction away from the worker.

The danger may be obviated by the industry furnishing adequate facilities for cleanliness, and by the workers making use of the facilities and observing proper rules for personal hygiene.

A periodical physical examination should be made of workers employed in handling arsenic or its compounds.

RECOMMENDATIONS.

The prophylaxis of arsenic poisoning rests as much with the worker as with the proprietors of the industry.

In all factories where arsenic is used, or where there is danger of accidental poisoning, there should be kept on hand, and in an

accessible place, the ingredients for freshly preparing the arsenic antidote, ferric hydroxide.

General Regulations for Employers where Arsenic or its Compounds are Used:

No female or male minor under 18 years of age shall be employed in handling arsenic and its compounds, or in any occupation where they may be exposed to dust, fumes or vapors containing arsenic or its compounds.

There shall be provided proper washing facilities with a sufficient supply of hot and cold water, soap, nail brushes and towels (individual).

Where dust is created, as in the processes of dusting, grinding, sieving, mixing or brushing, respirators, overalls and head coverings shall be provided, and kept in a cleanly condition. It shall be incumbent upon the proprietor to see that they are used.

Where dust, fumes, gases or vapors are generated as a result of handling material, or during the process of manufacture, means shall be supplied to remove same completely at the point of origin, and in a direction away from the worker.

No article of food or drink shall be permitted to be brought into any room where arsenic or its compounds are used, and no worker shall be permitted to partake of any food or drink in such room.

No worker shall be employed without a certificate from a physician as to physical fitness, and the worker shall be examined at least once in six months.

No worker who has been absent through illness shall be permitted to return to work without a physician's certificate to the effect that he is physically fit.

If a worker who has been in contact with arsenic complains of feeling ill, the employer shall have him examined by a physician, to determine if there is poisoning.

The use of smoking or chewing tobacco during the hours of labor shall be prohibited.

A place free from dust shall be provided for the purpose of the worker keeping such clothes as are not required during his work.

Regulations for Employees:

Workers should make use of the washing facilities and wash up thoroughly before eating any meals, or before leaving for home.

No food or drink should be brought into any room where arsenic or its compounds are used, and no food should be eaten there. Tobacco should not be used in any form while at work.

Respirators, overalls and head coverings should be worn while at work, and discarded before eating meals or leaving for home.

No worker shall interfere with the means provided for ventilation, or the removal of dust, fumes, gases or vapors.

If ill, report at once to the person in charge for examination by the firm's physician.

Regulations where Arsenic Impurities may Exist:

Where acids, which may contain arsenic impurities, are used in large quantities, the acid shall be tested before use, and if found to contain impurities, the workers shall be warned, and provisions made to safeguard them.

In chemical works where workers are required to enter tanks, chambers, or confined spaces, containing ingredients liable to contain arsenic impurities, provisions shall be made for thoroughly ventilating such places, and for analyzing contents, and the worker shall not enter such tank, chamber, or confined space, unless no danger exists.

Where fumes liable to contain arsenic (through impurities of materials used) exist, mechanical means for general ventilation shall be installed, and means shall be provided for removing the fumes at point of origin.

Regulations for Color Works:

No compounds of arsenic shall be ground, sieved, mixed, or handled, except by means of, or in an apparatus completely enclosed so as to prevent the escape of dust, or where an efficient exhaust system is installed to remove the dust entirely at the point of origin.

Overalls, head coverings and respirators shall be furnished for all workers, and shall be washed or renewed once a week.

A room, dry and free from dust, shall be provided where the worker may leave such clothing as is not worn during his hours of work. A separate room shall be provided for keeping overalls, head coverings and respirators in.

Adequate washing facilities shall be provided, consisting of a sufficient supply of hot and cold water, soap, and individual towels and nail brushes.

No food or drink shall be permitted to be brought in to any portion of the factory excepting in such room as shall be set aside for that special purpose. No food or drink, or the use of tobacco in any form, shall be permitted in any portion of the factory excepting the lunch room.

Every factory shall employ a physician who shall examine all applicants for work, and re-examine all workers at least once every three months, suspending any worker showing symptoms of poisoning.

If absent through illness, no worker shall be re-employed without a physical examination by the physician.

All physical examinations and cases of illness shall be recorded in a special book for that purpose, the same to be accessible for inspection by the Labor Department.

A suitable room entirely separate from rooms where processes of manufacture are carried on, shall be set aside as a lunch room, and no worker shall be permitted the use of such room until after removing and leaving outside, overalls, head coverings and respirators, and has thoroughly washed up.

Regulations for Employees:

All workers upon feeling ill should report at once to the attending physician.

All workers should observe the rules of personal hygiene, as cleanliness is the best antidote, therefore, use should be made of the facilities provided for cleanliness. No meals should be partaken of before removing work clothes and thoroughly washing up.

No food or drink should be brought into, or partaken of, in any room of the factory excepting the lunch room. Tobacco should not be used in any form during working hours.

Workers should wear the overalls, head coverings and respirators provided, removing same, and depositing them in the place provided, before washing up, entering the lunch room, partaking of food, or leaving for home.

No apparatus or means for removing dust should be interfered with or rendered ineffective.

In conclusion it may be stated, that while the history of poisoning from arsenic would seem to indicate a condition of remarkable safeness in the industries, it must be remembered that the industries wherein the greatest danger lies have not been included in the investigation.

I would recommend that provision be made for a further intensive investigation into arsenical poisoning.

Respectfully submitted,

C. T. GRAHAM-ROGERS,
Medical Inspector of Factories.

FACTORIES VISITED WHERE

| Index. | INDUSTRY. | Employees. | | Portion of plant visited. | Material used. | Ventilation. |
|--------|---------------------------|------------|--------|---------------------------------|---|---|
| | | Male. | Female | | | |
| 1 | Reduction of metals. | 14 | 0 | Melting room..... | Metallic lead, 30 tons a year. | Natural $\frac{3}{4}$ doors and windows; metal pots hooded. |
| 2 | Special alloys..... | 20 | 0 | Melting room..... | Metallic lead, 50 tons a year. | Natural doors and windows. |
| 3 | Plumbers' supplies... | 8 | 0 | Pipe and solder room. | Metallic lead, amount not given. | Natural doors and windows; 2 lead and 5 solder pots hooded. |
| 4 | Pipe drawing..... | 6 | 0 | Pipe room..... | Metallic lead, 4-5 tons a day. | Natural doors and windows; air paddies driven by power; 2 lead pots hooded. |
| 5 | Solder and Babbitt metal. | 3 | 0 | Solder casting room.. | Metallic lead, 20 tons a year. | Natural doors, windows and louvre roof; metal pots under large hood. |
| 6 | Plumbers' supplies... | 4 | 0 | Lead pipe room..... | Metallic lead, 2 tons a day. | Natural doors and windows; 2 lead pots hooded. |
| | | 2 | 0 | Solder room..... | | Natural; 1 lead pot hooded. |
| 7 | Carborundum..... | 76 | 0 | Wheel dressing and finishing... | Metallic lead, amount not given. | Exhaust system on grinders. |
| 8 | Firearms..... | 5 | ... | Blacksmith shop.... | Metallic lead, 150 lbs. a year. | Natural doors and windows. |
| | | 2 | 14 | Cartridge dept..... | Metallic lead, amount not given. | Natural doors and windows. |
| 9 | Firearms..... | 2 | 0 | Machine shop..... | Metallic lead, 400 lbs. a year. | Vacuum system. |
| 10 | Cutlery..... | 10 | 0 | Blacksmith shop.... | Metallic lead, amount not given. | Exhaust fan over one large lead pot; lead pots hooded. |
| 11 | Files and rasps..... | ... | ... | Blacksmith shop.... | Metallic lead, amount not given. | Natural doors and windows. |
| 12 | Brass goods..... | 6 | 0 | Casting room..... | Metallic lead, amount not given. | Natural windows and Texas roof; 1 lead pot, hooded. |
| 13 | Valves and hydrants. | 40 | 0 | Foundry..... | Metallic lead, amount not given. | Natural; hood over crucibles. |
| | | 10 | 0 | Hydrant dept..... | Metallic lead, and lead paint. | Natural. |
| 14 | Harness hardware... | ... | ... | Tinning room..... | Metallic lead,..... | Natural windows. |
| 15 | Brass and copper.... | 90 | 0 | Casting room..... | Metallic lead, amount not given. | Natural windows and Texas roof louvres. |
| | | | | Casting room, East Mill. | Metallic lead, amount not given. | Place all open; Texas roof with louvres. |
| 16 | Stamped ware..... | 6 | 9 | Soldering room..... | Metallic lead, amount not given. | Natural doors and windows. |
| | | 3 | 0 | Paint shop..... | Lead colors, amount not given. | Natural doors and windows. |
| 17 | Automatic fire sprinkler. | 5 | 0 | Solder room..... | Metallic lead, amount not given. | Natural; 1 solder furnace hooded. |
| 18 | Tin cans..... | 40 | 10 | Soldering room..... | Metallic lead, 900 lbs. a day. | Machines hooded to exhaust. |
| 19 | Tin cans..... | 5 | 0 | Solder making..... | Metallic lead..... | Natural and 4 solder pots with exhaust. |
| | | 2 | 7 | Hemming room..... | Metallic lead..... | Natural doors and windows. |
| | | 30 | 0 | Soldering room..... | Metallic lead, $\frac{1}{2}$ ton a day. | Machines hooded and piped. |

LEAD OR ARSENIC WAS USED.

| Air analysis. | CASES OF POISONING | | Welfare. | Remarks. |
|---|--------------------|---------|--|---|
| | Lead. | Arsenic | | |
| No lead present..... | 1 | ... | Hot and cold water, soap towels and goggles furnished. | Dirt floor clean; 1 lead pot has no hood. |
| No tests, melting pots idle.... | 0 | ... | Sink and cold water..... | 2 lead pots, no hood; meals eaten in lead room. |
| No lead present..... | 2 | ... | Cold water, gloves furnished. | 1 solder pot no hood; meals eaten in lead room; wood and brick floor untidy; gloves analysed after 1 day's use .00610 grams lead; after 3 days' use 1.37 grams of lead. |
| No lead present..... | 0 | ... | Hot and cold water, soap and gloves furnished. | Wood floor; metal dross on floor. |
| No lead present..... | 0 | ... | Hot and cold water, gloves furnished. | Concrete floor clean. |
| No lead present..... | 1 | ... | Cold water..... | Wood floors clean; meals eaten in room. |
| No lead present..... | 1 | ... | Cold water..... | Wood floor clean; meals eaten in room. |
| No lead present..... | 0 | ... | Hot and cold water, respirators, gloves and goggles | Wood floor dusty; 4 small lead pots no hood; 8 workers' use lead. |
| No tests..... | 0 | ... | Hot and cold water, soap furnished. | 1 lead pot, no hood; cement floor clean; meals eaten in room. |
| No lead present..... | 0 | ... | Hot and cold water, soap furnished. | Wood floor clean. |
| No tests..... | 0 | ... | Hot and cold water..... | ..... |
| No lead present..... | 0 | ... | Hot and cold water..... | Dirt floor clean; men given time to wash up. |
| No lead present..... | 0 | ... | Gloves furnished..... | 1 lead pot, no hood; no washing facilities. |
| No lead present..... | 1 | ... | ..... | No washing or drying room. |
| No lead present..... | 0 | ... | Hot and cold water..... | ..... |
| 5 mg. lead per cu. in. air at metal pot. | 2 | ... | Hot and cold water..... | Babbitt metal; heating food on metal pot; 1 case in hydrant painter; meals eaten in shop. |
| No tests, pot idle..... | 0 | ... | Hot and cold water..... | Wood floor clean; 1 lead and tin pot; no hood; meals eaten in room. |
| No lead present..... | 0 | ... | Hot and cold water..... | Cement floor clean; meals eaten in room. |
| No lead present..... | 0 | ... | Hot and cold water..... | Cement floor clean; meals eaten in room. |
| No lead present..... | 0 | ... | Hot and cold water, gloves furnished. | Wood floor clean; solder furnace not hooded; meals eaten. |
| No lead present..... | 1 | ... | ..... | ..... |
| No lead present..... | 0 | ... | Hot and cold water and soap | Wood floor clean. |
| .36 mg. lead per cu. m. air at solder pot. | ... | ... | Cold water and soap..... | ½ hour given help to wash up. |
| No lead at end where girls feed machines. | 0 | ... | ..... | Wood floor clean. |
| No tests..... | 1* | ... | Gloves furnished..... | Wood floor clean; meals eaten in room. |
| No lead present..... | 0 | ... | ..... | Sold put on cold by machine; wood floor clean. |
| At seam soldering machine pot 1.3 mg. lead per cu. m. | 2 | ... | Cold water and gloves furnished. | Exhaust system temporarily disabled; some hoods being changed; wood floor clean; meals eaten in room. |
| At end soldering machine pot 2.6 mg. lead per cu. m. | | | | |

FACTORIES VISITED WHERE LEAD

| Index. | INDUSTRY. | Employees. | | Portion of plant visited. | Material used. | Ventilation. |
|--------|------------------------|------------|---------|---------------------------|--|--|
| | | Male. | Female. | | | |
| 20 | Tin cans..... | 200 | 100 | Soldering room..... | Metallic lead, several tons daily. | Machines hooded with exhausts. |
| 21 | Tin cans..... | 4 | 0 | Soldering room..... | Metallic lead, amount not given. | Natural doors and windows. |
| 22 | Colors and paints.... | 20 | 0 | Mixing room..... | Linseed oil, lead carbonate, oxides, chromes, arsenic. | Natural windows. |
| | | | | Packing room..... | Arsenic..... | Natural windows. |
| 23 | Paints..... | 2 | 0 | Grinding room..... | Lead, carbonate, oxides, and chromes, amount not given. | Natural windows. |
| | | 11 | 0 | Mixing room..... | Linseed oil, lead colors. | Natural windows. |
| 24 | Paints..... | 9 | 3 | Mixing room..... | Arsenic greens, lead carbonate, oxides and chrome, 200 tons a year. | Natural windows. |
| | | 2 | 0 | Putty room..... | Lead carbonate and oxide, whiting, linseed oil. | Natural windows. |
| 25 | Paints..... | 3 | 0 | Mixing room..... | Lead carbonate, oxides and chromes. | Natural windows. |
| 26 | Paints..... | 3 | ... | Mixing room..... | Lead carbonate and oxides, 500 lbs. a week. | Natural windows. |
| 27 | Varnish and Enamels | 3 | 0 | Mixing room..... | Lead carbonate and oxides, 200 tons a year. | Natural windows and skylight. |
| | | 7 | 0 | Chimney room..... | Lead carbonate, oxides and chromes, 2 tons a year. | Natural chambers with flues to stack for kettles. |
| | | 1 | 0 | Enamel mixing room. | Lead carbonate, oxides and chromes. | Natural windows. |
| 28 | Oil cloth..... | 4 | 0 | Mixing room..... | Lead carbonate, oxides and chromes, amount not given. | Natural windows. |
| | | 4 | 0 | Varnish room..... | Litharge..... | Natural kettles hooded to vent pipe. |
| 29 | Artificial leather.... | 6 | 0 | Mixing room..... | Castor oil, lead carbonate, chromes, arsenic greens. | Natural windows and skylights. |
| 30 | China ware..... | 6 | 0 | Glaze dipping..... | Lead carbonate..... | Natural windows. |
| | | 4 | 14 | Litho transfer dept.. | Lead carbonate and chromes. | Exhaust over dusting and machines. |
| 31 | China ware..... | 2 | 4 | Glaze dipping..... | Lead carbonate..... | Natural doors and windows. |
| | | 2 | 6 | Decorating room.... | ..... | Natural tinting done under hood with exhaust. |
| 32 | Electric insulators... | 3 | 0 | Lead fusing room.... | Metallic lead, 5 tons a year. | Natural doors and windows, lead pots under brick hood. |
| 33 | Glass..... | 7 | 0 | Mixing and weighing room. | Lead carbonate and oxide, 500 tons a year; arsenic, 6 tons a year. | Natural windows and skylights; arches to other rooms. |
| 34 | Glass..... | 50 | 0 | Furnace room..... | Lead carbonate and oxide in furnaces, 50 tons a year; arsenic, 1 ton a year. | Natural windows. |
| 35 | Out glass..... | 12 | 0 | Finishing room..... | Lead putty..... | Natural windows and skylights. |
| | | 1 | 0 | Putty room..... | Metallic lead..... | Natural windows and skylights. |
| 36 | Out glass..... | 4 | 0 | Finishing room..... | ..... | Natural windows and skylights. |

OR ARSENIC WAS USED — Continued.

| Air analysis. | CASES OF POISONING. | | Welfare. | Remarks. |
|--|---------------------|---------|--|---|
| | Lead. | Arsenic | | |
| No lead present..... | 0 | ... | ..... | Meals eaten in room; wood floor clean. |
| No lead present..... | 0 | ... | Hot and cold water, soap towels and gloves. | Hand soldering furnaces not hooded; meals eaten; place clean. |
| No lead or arsenic present.... | 2 | 0 | Hot and cold water..... | Mills and grinders open; wood floor dirty. |
| No lead or arsenic present.... | 0 | 0 | Hot and cold water..... | No arsenic manufacturing; no provisions for handling dust. |
| No lead present, no dusty process at time of visit and tests | 2 | 0 | ..... | Wood floor dirty; no provisions to keep down dust; meals eaten in all rooms. |
| No lead present, no dusty process at time of visit and tests | 2 | 0 | ..... | Wood floor dirty; no provisions to keep down dust; meals eaten in all rooms. |
| No dusty processes at time of visit. | 0 | 0 | Hot and cold water, soap and towels. | Rooms partitioned off mixing room for dressing and lunch room. |
| ..... | 0 | ... | ..... | Many males and females eat lunch in the mixing rooms. |
| No lead present..... | 0 | ... | Hot and cold water, soap and towels. | Wood floor clean; no dry colors being handled at time of visit. |
| ..... | 1 | ... | Hot and cold water, soap and towels. | Wood floor clean; no dry colors being handled at time of visit. |
| No tests..... | 0 | ... | Hot and cold water, shower baths, soap and towels; respirators and gloves furnished. | No handling of dry colors at time of visit. |
| No lead present..... | 0 | ... | ..... | ..... |
| No tests..... | 0 | ... | ..... | Mills inclosed. |
| No dry mixing being done, no lead present. | 0 | ... | Hot and cold water..... | New mixer being installed. |
| No lead present..... | 0 | ... | ..... | ..... |
| Faint traces of lead under microscope. | 0 | ... | Hot and cold water, company physician. | Concrete floor clean; strong odor of amyl. |
| Traces of lead found..... | 0 | ... | Company has a physician, notices are posted. | Floors dampened during day; cleaned once a day. |
| No lead present..... | 0 | ... | Hot and cold water, soap towels and mills furnished | ..... |
| Traces of lead found..... | 0 | ... | Hot and cold water, soap, towels and aprons furnished. | Analysis of wash water used by one girl: Floors dampened during day, mopped at night. |
| No lead present..... | 0 | ... | ..... | No dust removers on litho transfer work. |
| No tests, no lead being run... | 0 | ... | Sink and cold water..... | No lead used in porcelain glaze; analyzed none found. |
| Weighing 3.3 mg. lead per cu. metre, no arsenic. | 2 | 0 | Respirators furnished, emergency hospital. | No provisions to keep down; men do not wear respirators. |
| Mixing 2.6 mg. lead per cu. metre, no arsenic. | 0 | 0 | ..... | Place old and poorly lighted; no mixing being done. |
| No lead or arsenic present.... | 0 | 0 | ..... | ..... |
| No lead present..... | 6 | ... | Water, soap and respirators furnished. | Wood floor clean; workers careless; do not use respirators. |
| No lead present..... | 0 | ... | Water, soap and respirators furnished. | Floor clean. |
| No lead present..... | 0 | ... | Soap and water..... | Wood floor clean; only few finishers at work; 1 case reported to department, not there. |

FACTORIES VISITED WHERE LEAD

| Index. | INDUSTRY. | Employees. | | Portion of plant visited. | Material used. | Ventilation. |
|--------|-----------------------------|------------|---------|-------------------------------|--|--|
| | | Male | Female. | | | |
| 37 | Rubber goods, | 4 | 0 | Weighing room. | Lead carbonate, oxide, chromate, arsenic colors. | Natural doors and windows. |
| | | 1 | 0 | Mixing room. | Lead carbonate, oxide, chromate, arsenic colors. | Natural doors and windows. |
| | | 100 | 25 | Cement room. | Lead sulphide combined in rubber. | Natural doors and windows. |
| 133 | Rubber tubes and tires. | 1 | 0 | Weighing room. | Lead carbonate and oxides. | Natural doors and windows. |
| | | 4 | 0 | Mixing room. | Lead carbonate and oxides. | Natural doors and windows. |
| 39 | Enamelled letters. . . . | 5 | 15 | Main room. | Metallic lead. | Natural doors and windows. |
| 40 | Enamelled letters. . . . | 3 | 0 | Main room. | Metallic lead. | Natural doors and windows. |
| 41 | Sulphuric acid. | ... | ... | Acid room. | Lead chambers in use. . | Natural doors and windows. |
| 42 | Jewelry and novelties | 8 | 30 | Enamel room. | Metallic lead and lead colors. | Enamel ovens connected with exhaust. |
| | | 8 | 30 | Setting up room. . . . | Metallic lead and lead colors. | Natural metal pots hooded. |
| 43 | Cream separators. . . . | 15 | 0 | Paint shop. | Lead putty containing 65% lead. | Plenum system. |
| | | 30 | 0 | Soldering room. | Metallic lead. | Natural windows and skylights. |
| 44 | Wheels and carriage bodies. | 8 | 0 | Finishing room. | Lead colors and varnish. | Natural doors and windows. |
| | Automobile bodies. . . | 12 | 0 | Finishing room. | Lead colors and varnish. | Natural doors and windows. |
| 45 | Carriage painting. . . . | 4 | 0 | Paint shop. | Lead colors and varnish. | Natural doors and windows. |
| 46 | Automobile bodies. . . | 6 | 0 | Finishing room. | Lead colors and varnish. | Natural doors and windows. |
| 47 | Carriages. | 10 | 0 | Finishing room. | Lead colors and varnish, 500 lbs. a year. | Natural doors and windows. |
| 48 | Carriages. | 50 | 0 | Paint shop. | Lead colors and varnish, 1 ton a year. | Natural doors and windows. |
| 49 | Lithographing. | 150 | 0 | Press room. | Lead colors used. | Plenum system. |
| | | 2 | 0 | Color mixing room. . . | Lead colors and arsenic greens. | Natural doors windows and skylights. |
| | | 12 | 0 | Bronzing room. | Bronzing powder. | Plenum system; exhaust system on bronze machines. |
| 50 | Newspaper. | 45 | 0 | Linotype and stereotype room. | Metallic lead in type. . . | 2-24 inch exhaust fans; pots of linotype and stereotype machines hooded. |
| 51 | Newspaper. | 6 | 0 | Linotype room. | Metallic lead in type. . . | 30 inch exhaust fan; linotypes hooded and piped. |
| | | 4 | 0 | Stereotype room. | Metallic lead in type. . . | Natural air shaft, metal pot hooded. |
| 52 | Storage batteries. . . . | 20 | 0 | Casting room. | Metallic lead, 24 tons a day. | Natural windows and skylights. |
| | | 17 | 0 | Pasting room. | Lead oxide compounds. | Exhaust system to pasting tables. |
| | | 12 | 0 | Assembling. | Burning off pasted plates. | Natural doors and windows. |
| 3 | Storage batteries. . . . | 50 | 0 | Casting room. | Metallic lead, 30 tons a day. | Metal pots connecte to exhaust. |
| | | 28 | 0 | Pasting room. | Lead oxide compound. . | Exhaust system on pasting tables. |
| | | 2 | 0 | Weighing room. | Lead oxide. | All operations connected to exhaust. |
| | | 40 | 0 | Burning off room. . . . | Burning off pasted plates. | Exhaust system. |

OR ARSENIC WAS USED—Continued.

| Air analysis. | CASES OF POISONING | | Welfare. | Remarks. |
|---|--------------------|---------|---|---|
| | Lead. | Arsenic | | |
| No lead or arsenic present.... | 0 | 0 | Hot and cold water, respirators furnished. | Wood floor clean; no weighing being done; men do not use respirators. |
| 8 mg. lead per cu. metre air, no arsenic. | 0 | 0 | Gloves furnished, 8 mg. lead per cu. metre air, no arsenic. | Workers covered with dust, place dusty. |
| No lead present..... | 0 | ... | Hot and cold water..... | Concrete floor clean; odor of naphtha and benzine strong. |
| No tests, no weighing being done. | 1 | ... | Cold water, gloves furnished | Wood floor clean; no hoods over mixers. |
| No lead present..... | 0 | ... | Cold water, gloves furnished | Wood floor clean; meals eaten; no ingredients being added to mixer. |
| No lead present..... | 0 | ... | Cold water..... | Wood floor clean; metal pot not hooded. |
| No lead present..... | 0 | ... | Cold water..... | Wood floor clean; metal pot not hooded. |
| No lead present, no arsenic... | 0 | 0 | ..... | Acid chamber leaking. |
| No lead present..... | 0 | ... | Hot and cold water, soap... | Wood floor clean; meals eaten in shop. |
| No lead present..... | 0 | ... | Hot and cold water, soap... | Wood floor clean. |
| Centre of room no lead present breathing level of sandpaper 68.8 mg. per cu. m. | 4 | ... | Hot and cold water, soap... | Concrete floor clean; putty applied by hand, baked on, then sandpapered. |
| No lead present..... | 0 | ... | Hot and cold water, soap... | Wood floor clean; no hoods over solder furnaces or machines. |
| 2.2 mg. lead per cu. m. at level of sandpaper, no lead in centre of room. | 1 | ... | Cold water..... | Wood floor clean. |
| No lead present..... | 0 | ... | Cold water..... | Concrete floor clean. |
| No lead present..... | 2 | ... | Cold water..... | Wood floor clean; no sandpapering at time of visit; meals eaten. |
| No lead present..... | 2 | ... | Cold water..... | Wood floor clean; no sandpapering at time of visit; meals eaten. |
| No lead present..... | 0 | ... | Hot and cold water..... | Wood floor clean; no lead filler used wet pumice and rubbing done; meals eaten in room. |
| No lead present..... | 2 | ... | Hot and cold water..... | Wood floor clean; meals eaten in shop. |
| No lead present..... | 0 | ... | Hot and cold water, soap and towels furnished. | Cleaning off of litho stones done in one portion of room. |
| No lead or arsenic present.... | 1 | 0 | ..... | Mixers open; pony mixer enclosed; no provisions for handling dust. |
| No lead or arsenic present.... | 0 | 0 | Vacuum cleaner for floors and benches. | Analyses of bronze powder showed no lead or arsenic present. |
| No lead present..... | 0 | ... | Cold water, soap and towels | Wood floor clean: Stereotype room is a portion of the composing (linotype) room. |
| No lead present..... | 0 | ... | Cold water soap and towels | Wood floor clean. |
| No lead present..... | 0 | ... | Cold water..... | Wood floor; dross scattered about. |
| 3.4 mg. lead per cu. m. of air. | 3 | ... | Hot and cold water, soap, towels and gloves furnished, also pills if asked for. | Gloves in poor shape; no hoods over metal pots. |
| 4.2 mg. lead per cu. m. of air. | 7 | ... | ..... | Place dirty; men careless. |
| 2.6 mg. lead per cu. m. of air at lead burner. | 4 | ... | ..... | Wood floor clean; tables dampened during day. |
| 1.0 mg. lead per cu. m. of air at pots. | 1 | ... | Hot and cold water, soap and soap powder, towels, gloves and respirators furnished. | Material on floor; litharge found in water cooler; workers unclean. |
| 1.2 mg. lead per cu. m. of air. | 17 | ... | ..... | ..... |
| No lead present..... | 0 | ... | ..... | ..... |
| 1.8 mg. lead per cu. m. of air at burners table. | 2 | ... | ..... | 1 case of lead poisoning was from assembling room. |

FACTORIES VISITED WHERE LEAD

| Index. | INDUSTRY. | Employees. | | Portion of plant visited. | Material used. | Ventilation. |
|--------|------------------------|------------|---------|-----------------------------------|---|---------------------------------------|
| | | Male. | Female. | | | |
| 54 | Electrical equipment. | 110 | 0 | Brass foundry..... | Metallic lead, amount not given. | Natural crucibles under hood. |
| | | 45 | 0 | Cable department... | Metallic lead, amount not given. | Natural windows, Texas roof, louvres. |
| | | 5 | 0 | Rubber insulating, weighing room. | Lead oxides, amount not given. | 2-30 inch exhaustfans in window. |
| | | 40 | 0 | Rubber insulating, mixing room. | Lead oxides compound, amount not given. | Natural windows and doors. |
| | | 10 | 60 | Soldering room..... | Metallic lead, amount not given. | Solder furnace hooded to exhaust. |
| 55 | Electrical equipments | 17 | ... | Brass foundry..... | Metallic lead..... | Natural Texas roof, louvres. |
| 56 | Electrical cables..... | 8 | ... | Cable department.... | Metallic lead..... | Natural. |
| | | 6 | ... | Lead cable room.... | Metallic lead..... | Natural metal pots hooded and piped. |
| | | 2 | ... | Rubber cable, weighing room. | Lead oxide..... | Natural windows and skylights. |
| | | 6 | ... | Rubber cable, mixing room. | Lead oxide compounds. | Natural windows and skylights. |
| 57 | Motor vehicles..... | 18 | 0 | Foundry..... | Metallic lead..... | Natural windows Texas roof, louvres. |

C. T. GRAHAM-ROGERS,

Medical Inspector of Factories.

OR ARSENIC WAS USED — Continued.

| Air analysis. | CASES OF POISONING. | | Welfare. | Remarks. |
|---|---------------------|--------------|--|--|
| | Lead. | Ar-
senic | | |
| ..... | 0 | ... | Hot and cold water, soap... | Concrete floor and dirt; meals eaten in room. |
| No lead present..... | 0 | ... | Hot and cold water..... | Metal pots not hooded. |
| 6 mg. lead per cu. metre air... | 2 | ... | Hot and cold water and res-
pirators. | Men do not wear respirators fur-
nished. |
| .05 mg. lead per cu. metre at
masticators. | 5 | ... | Hot and cold water and res-
pirators. | Men do not wear respirators fur-
nished; meals eaten in room. |
| No lead present..... | 0 | ... | Hot and cold water..... | Wood floor clean. |
| ..... | 0 | ... | Water..... | Men not clean; meals eaten in room. |
| | 0 | ... | Hot and cold water, gloves
furnished. | Wood floor not clean; men do not
wear gloves and are not clean. |
| No lead present..... | 0 | ... | Water..... | Meals eaten in the factory and the men
are not clean. |
| 1.2 mg. per cu. m. air..... | 1 | ... | Water..... | |
| 2.9 mg. per cu. m. air at mixers | 2 | ... | Water..... | |
| Traces of lead present..... | 0 | ... | ..... | Flow brick and dirt; men careless. |

JOHN H. VOGT, B. S.,
Analyst.

RESULTS OF SPECIAL ANALYSES.

| SPECIMEN ANALYZED. | Sex of operator. | Occupation. | Length of time specimen was in use or operative had been at the occupation. | Grams of lead found. | Percentage of lead. |
|--------------------------------------|------------------|---|---|----------------------|---------------------|
| Pair of gloves..... | Male..... | Lead pipe worker..... | Gloves in use 1 day..... | .6100 | ..... |
| Pair of gloves..... | Male..... | Lead pipe worker..... | Gloves in use 3 days..... | 1.3700 | ..... |
| Piece of clothing..... | Male..... | Pigment mixer, rubber works..... | Clothes in use 3 months in factory..... | .1260 | ..... |
| Respirator sponge..... | Male..... | Mixer, lead glass works..... | In use 2 or 3 months..... | .3760 | ..... |
| Filler and dye for tan shoes..... | Male..... | Removing defects, shoe factory..... | ..... | ..... | 12% chromate. |
| Filler and dye for tan shoes..... | Male..... | Removing defects, shoe factory..... | ..... | ..... | 14% chromate. |
| Water, hands were washed in..... | Female..... | Assistant to glaze dipper, pottery..... | Hands washed after 4½ hours morning work..... | ..... | ..... |
| Water, hands were washed in..... | Male..... | Compositor, job or hand..... | Hands washed after 4 hours morning work..... | .0040 | ..... |
| Water, hands were washed in..... | Male..... | Color mixer, lithographing works..... | After 5 hours morning work..... | .0003 | ..... |
| Accumulation under finger nails..... | Male..... | Solderer, metal ware..... | Wiped on cloth, then washed..... | .0874 | ..... |
| Urine analysis..... | Male..... | Burner off, storage batteries..... | Worked 4 years as solderer; never cleaned nails thoroughly..... | .0023 | ..... |
| Urine analysis..... | Male..... | Paster, storage batteries..... | Worked 2 years at burning off plates..... | ..... | No lead found. |
| Urine analysis..... | Male..... | Carriage painter..... | No symptoms..... | ..... | Traces of lead. |
| Floor sweepings..... | ..... | Newspaper, linotype room..... | No symptoms..... | ..... | Traces of lead. |
| Floor sweepings..... | ..... | Glaze mixing, pottery..... | Floor cleaned daily. Sample at linotype late at night..... | 17.4000 | ..... |
| Floor sweepings..... | ..... | Soldering room, can factory..... | Floor cleaned daily. Sample taken at end of work day..... | 10.6100 | ..... |
| Rubber after leaving masticator..... | ..... | Secured from mixing machine..... | Floor cleaned daily. Sample from under machine at end of day..... | 30.7600 | ..... |
| Rubber after vulcanizing..... | | Taken from lot leaving vulcanizer..... | | | 25% lead. |
| | | | | | 24+ % lead. |

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LEAD AND ARSENIC POISONING.

In compiling the following bibliography an endeavor has been made to afford a ready reference to specific articles relating to the subjects investigated. The material is as nearly up to the present date as it was possible to ascertain.

There have no doubt been a number of articles overlooked, and to have enumerated all the references in works on medicine and hygiene would have been an enormous task, so they were omitted.

A general bibliography of occupational diseases has been prepared by Dr. Andrews, of the American Association for Labor Legislation, and will be found in "American Labor Legislation Review," Vol. 2, No. 2, June, 1912.

A bibliography on Occupational Mortality, compiled by Dr. Hoffman, may be found in Bulletin No. 79 of the United States Department of Commerce and Labor, Bureau of Labor.

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APPENDIX IX

PRELIMINARY REPORT ON EMPLOYMENT OF WOMEN AND CHILDREN IN MERCANTILE ESTABLISHMENTS

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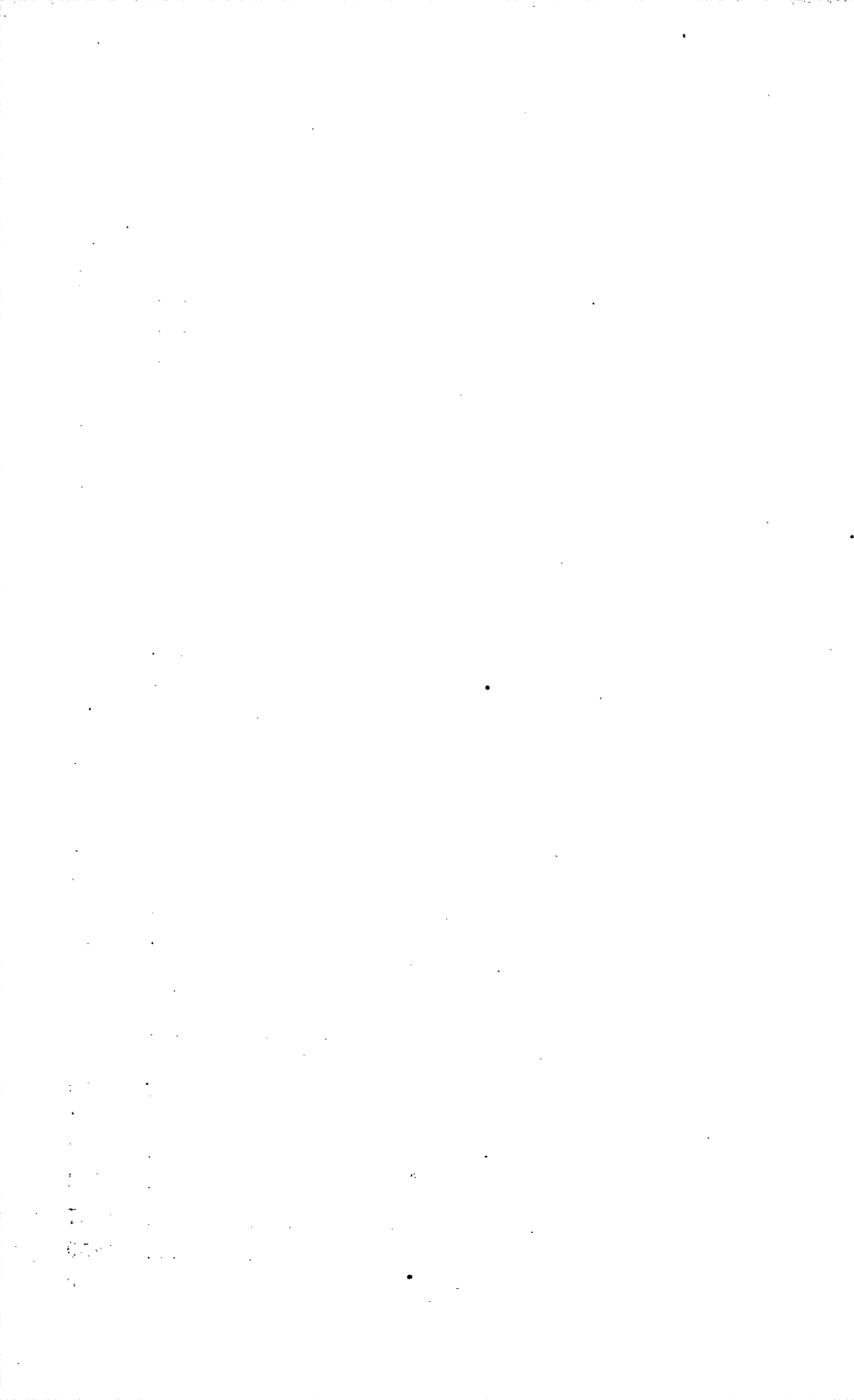
APPENDIX IX

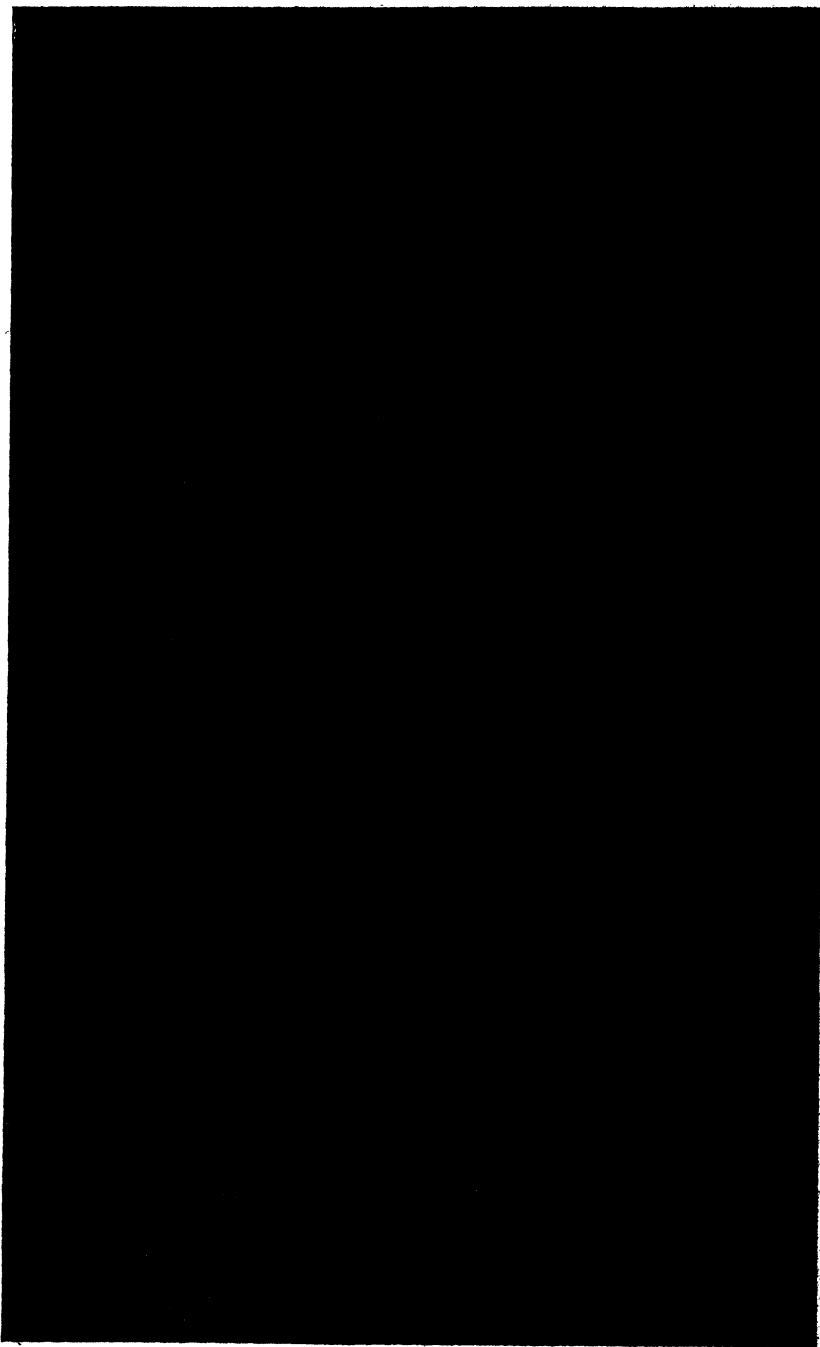
PRELIMINARY REPORT

ON

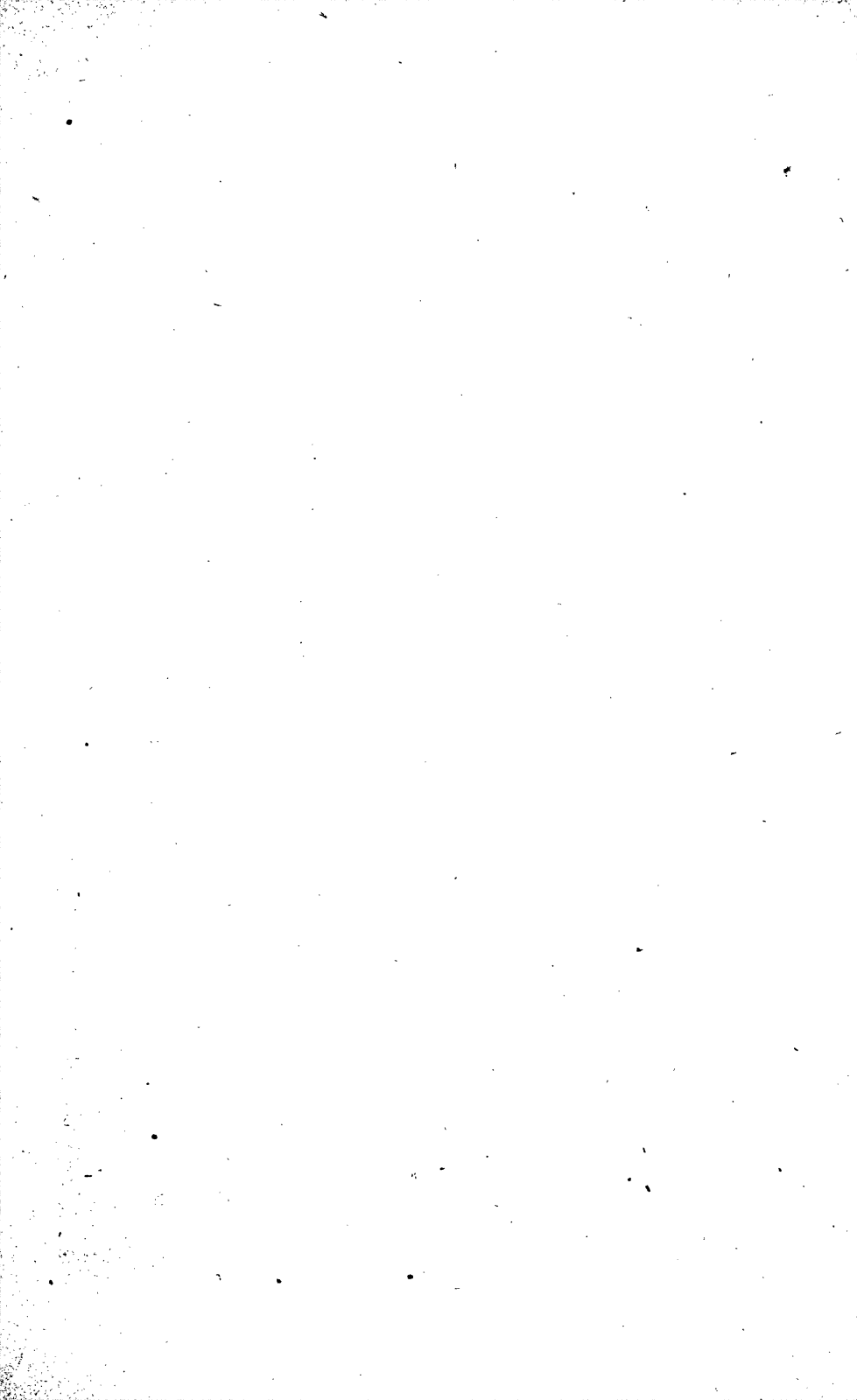
EMPLOYMENT OF WOMEN AND CHILDREN IN MERCANTILE ESTABLISHMENTS

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FLOOR CASHIER AT WORK ABOVE SALES COUNTER.



PRELIMINARY REPORT

ON THE

EMPLOYMENT OF WOMEN AND CHILDREN IN MERCANTILE ESTABLISHMENTS

I. INTRODUCTORY

The investigations of the Commission have dealt almost exclusively with conditions of work in factories and in industrial establishments carried on under the factory system. Here were found the chief problems of sanitation, poisonous processes and danger of accident. But as the work progressed it was realized that the conditions of employment of workers in other pursuits could not be ignored. There was need of similar study of the workers in commerce as well as in manufacture. In the past few decades, according to the United States census, the number of female workers in commerce has increased more quickly than in any other field of labor. It was consequently the duty of the State Factory Commission to learn the nature of this employment.

During this brief survey, however, only one group of workers in commercial pursuits could be singled out for study, namely, the women and children employed in the large retail establishments, both department and five and ten-cent stores. It was necessary to rule out the countless small neighborhood stores which are managed chiefly by the owner and his family with possibly a few assistants. We, therefore, included in this inquiry only those stores which employed at least ten women and children. Even with the limit thus sharply defined, the establishments described are heterogeneous in character. They include such extremes as the dingy premises of made-over dwelling houses and also the up-to-date structures that house a modern emporium. In management they vary from haphazard supervision to orderly centralized administration. Equally diverse, as we shall see, is the treatment of employees.

This special inquiry was carried on during the months of November and December, 1912. Seven investigators were engaged in the field work. Several served only a few weeks, the others were retained for two months. They secured information

from store superintendents and managers and occasionally from conversation with employees. A number of our agents, acting as inside investigators, obtained positions in the stores, and reported their own experiences as working girls. They had an opportunity to make observations covering several days or weeks in different establishments. Instead of relying on the brief inspections of the official agents who were conducted through the stores, we were able to obtain facts that sometimes were unknown even to the heads or proprietors. In several instances they welcomed these reports and made improvements based upon them. The data we collected was in large part corroborated by the testimony of department store girls at a hearing of the Commission.

On account of the short time available and the wide field of the inquiry, it was necessary to confine our observations to a few specific points. They were: 1) Conditions of work; 2) Length of hours; 3) Wages and earnings.

It was appropriate that this preliminary investigation should concern itself almost exclusively with the welfare of the women and children, since they constituted 68% of the working force. They numbered some 40,000 workers.

Practically all department stores employing ten or more women and children were covered in Greater New York and as far as possible in Buffalo and Rochester, and in the six cities of the second class: Yonkers, Albany, Troy, Utica, Syracuse and Schenectady. Two hundred and sixteen (216) establishments in all were inspected. They vary in size from the largest New York City department stores each employing several thousand employees to the chain of small five and ten cent stores which extends across the state. One-third of the entire number of establishments visited are five and ten cent stores. Most of these employ less than fifty (50) persons but five have more than one hundred (100) employees. The department stores proper have a far larger labor force under their roofs; thirty employ more than five hundred (500) persons, eighteen have over one thousand (1,000) employees, and nine have over two thousand (2,000).

The total number of workers concerned in both groups is far greater than the number of establishments would lead one to expect, for it amounts to the significant figure of 61,717.

TABLE No. 1.
NUMBER OF STORES AND NUMBER OF EMPLOYEES.

| | DEPARTMENT STORES. | | | FIVE & TEN CENT STORES. | | | Grand total. |
|-------------------------------|--------------------|-----------|--------|-------------------------|-----------|--------|--------------|
| | New York City. | Up-State. | Total. | New York City. | Up-State. | Total. | |
| Number of stores..... | 83 | 62 | 145 | 48 | 23 | 71 | 216 |
| Number of employees.... | 47,280 | 12,278 | 59,558 | 1,195 | 964 | 2,159 | 61,717 |
| Number of women..... | 29,067 | 7,583 | 36,650 | 980 | 755 | 1,735 | 38,385 |
| Number of children..... | 2,655 | 1,070 | 3,725 | 17 | 4 | 21 | 3,746 |
| Percentage of total employees | | | | | | | |
| Women..... | 61.5 | 61.8 | 61.5 | 82.0 | 78.3 | 80.3 | 62.2 |
| Children..... | 5.6 | 8.7 | 6.3 | 1.4 | .4 | 1.0 | 6.1 |

II. ORGANIZATION OF THE DEPARTMENT STORES

During the past few decades the general or neighborhood store, with its untidy accumulation of sundries, has been largely replaced by great mercantile establishments which have arranged and assorted in department after department the stock of hundreds of smaller stores. As an offshoot of these great shops, the specialty stores, offering only one line of goods, usually articles of woman's wear, have developed in the large cities. Even more recently the five and ten cent stores, controlled for the most part by one company, have had a rapid growth in towns and cities across the state. These cater to the wants of a still different class of customers.

The most striking feature in this expansion has been the introduction of female help. A single generation has seen the substitution of women for men in positions of all kinds, for selling as well as for clerical work. Doubtless before long men will be found only as floorwalkers, as salesmen in a few departments, and for the heavy work of packing and shipping. At the time of our inquiry men constituted only 32% of the total number of employees in the stores investigated.

On the other hand, the women numbered 38,385 or 62%, and the children numbered 3,746 or 6% of the total. Since these figures were collected during the rush season before Christmas, they represent approximately the maximum number employed in these establishments at any time of the year.

The records of most of the stores do not enable us to classify the female employees above 16 years of age according to age, even to differentiate those below from those above 21 years of age. It is known from other sources that department store help is very young. The United States census of 1900 states that "three-fifths of the total number of saleswomen 16 years of age and over are under 25 years of age." These data were collected in 1900, over a decade ago, and the figures of the last census are not yet published. In the present study, time did not suffice to make a detailed enumeration of all female employees by age groups. But there is every reason to believe that the same large proportion of youthful workers still persists.

The organization of the modern department store is highly complex. According to a rough classification, the rank and file of the women and children employees were, for the purpose of our inquiry, subdivided into five classes: 1. The saleswomen and floor help, including floor cashiers and wrappers; 2. Office and audit; 3. Stock girls; 4. Packers and shippers; 5. Mail order clerks.

TABLE No. 2.

NUMBER AND PER CENT. OF WOMEN AND CHILDREN IN 145 DEPARTMENT STORES ACCORDING TO DEPARTMENTS.

| | Number. | Per cent. |
|------------------------------|---------|-----------|
| 1. Saleswomen..... | 24,234 | 66.1 |
| 2. Office help..... | 5,757 | 15.7 |
| 3. Stock girls..... | 4,386 | 12.0 |
| 4. Packers and shippers..... | 1,382 | 3.8 |
| 5. Mail order clerks..... | 891 | 2.4 |
| Total..... | 36,650 | 100.0 |

Although these subdivisions may not be sharply defined in every store, yet for all practical purposes they correspond to the main divisions of the work in the large stores.

The greatest number, 66% of all women employed, were saleswomen. The office help, though next in numbers, was a very much smaller class, only 15.7%. It includes employees with diverse duties, audit girls, bookkeepers and cashiers, also the pneumatic tube girls who make change for the saleswomen. Work in a modern department store is so specialized that at many

counters the saleswomen are assisted by stock girls who bring goods to the counter and keep them in order. These young girls constituted 12% of the whole number of female workers. After some experience in the care of stock, they are advanced to be saleswomen, if they show aptitude for the work. In a few stores girls and women were employed as packers and shippers. They made up not quite 4% of the total. There were only 2% of mail order clerks.

III. CHILD LABOR.

It was found that children under 16 years of age numbered only 3,746 or 6.1% of the entire number of employees. In 119 stores, or more than half of the stores visited, no children were employed at the time of the Commission's inspections. Only 21 children were at work in the five and ten cent stores.

The small percentage of child workers in department stores is somewhat surprising. There are several reasons which may account for this. Twenty years ago scores of little cash girls or boys were a common sight in all department stores. But now the invention and increasingly general use of mechanical carriers have almost eliminated the use of children to carry packages about the store. Another reason may be the inability of the children to satisfy the demands now made upon them. Prominent merchants have asserted before legislative committees and elsewhere that they cannot profitably employ children under 16 years because of lack of judgment and ability to perform their duties satisfactorily. It must also be remembered that the employment of children is fixed by law at nine hours, and no child can be required to work before 8 A. M. or after 7 P. M. in any day. This nine hour day — one hour shorter than the time allowed for girls 16 to 21 years — is probably another reason for the diminishing number of children in stores. Many merchants dispense with them entirely rather than assume the obligation of keeping them on a different hour schedule than the older girls. According to the Labor Department records, one of the largest stores in New York city has reduced during the past four years the number of children it employs by more than a half.

As might be expected, the percentage of children used in Up-State stores (8.1 per cent) was larger than in New York City

(5.5 per cent). Yet department stores outside of New York are fast becoming equipped with all the newest labor-saving devices, and will doubtless soon reduce the number of children on their payrolls.

It is noteworthy, however, that a number of the largest stores still find it profitable to employ children. In the investigation of the 97 stores which engaged children, it was found that 18 employed 25 to 49 each; 11 employed 50 to 99 children, and 11 over 100 each.

The younger children are assigned chiefly to messenger work. They must be constantly alert to the call of the saleswoman, floor-walker, department heads, and office managers. In the immense city stores whose floor area sometimes covers acres, these children may travel many miles a day on their rounds. In some respects they are less favored than the salesgirls. The latter, when working at regular counters, at least have a limited number of seats provided for them. Messengers, however, by the nature of their work, are almost constantly on their feet, and rarely have seats provided for the intervals when they are not engaged. The exertion of almost continuous standing or running about for children just out of school is harmful, especially for young girls.

The fact should not be overlooked that children who work in large establishments and come into daily contact with three to five thousand employees are subjected to far greater nervous strain than the employees of small stores. While the tasks required of them may be the same, yet there can be no reasonable doubt that the strain is less on the growing child, if she works in an atmosphere of greater quiet and less constant stimulation.

Besides acting as messengers or as cash girls or boys, children in department stores are more and more being used as parcel wrappers and floor cashiers. The nervous tension of this work upon young girls was found to be of a serious character. It will be described in detail in the part of the report dealing with the various divisions of the work.

It may be asked: Why are children allowed to work in factories only eight hours a day ending at 5 o'clock, while children of the same age may work in mercantile establishments an hour longer each day? This is doubtless due in part to a popular idea

that work in a factory is harder. But this opinion is based on a misconception of the duties required of the children in stores. In this inquiry much information was obtained proving, beyond a doubt, that mercantile like factory employment is a great tax on growing children.

Mr. James L. Gernon, Chief Mercantile Inspector, who was formerly a factory inspector, is well qualified to give an opinion after four years in charge of the mercantile bureau. He writes in his last annual report: "The work in mercantile establishments as a rule is harder on young children than in factories. Children in factories are generally permitted to sit at their work, while in mercantile establishments they are employed as messengers, or in the distribution of merchandise, and are on their feet almost all day, and work long hours."

IV. WHAT THE STORES PROVIDE FOR THE WORKERS.

The fundamental idea of store management is to attract customers within doors and once there to tempt them to stay and to buy. Accordingly everything possible is done to please and gratify the public. No firm can afford to present to view premises that are dirty or in ill repair. They must always be clean, well kept and well arranged in order to create a favorable impression on the purchasers. Artistic displays of merchandise allure the passersby; within, the comforts and conveniences designed for the customers play an important part. The new stores are competing in the construction and equipment of rest rooms, hospital rooms, marble toilets, drinking fountains, restaurants, etc. In fact all the comforts and luxuries of the modern hotel are being introduced into the modern department store.

In building and furnishing these palatial structures the thousands of employees who serve the customers have not been overlooked. More and more are merchants realizing that it pays to maintain not only the finest conveniences for customers, but also good toilet facilities, lunch and recreation rooms for employees. Of course such elaborate care can be given only to employees of the large establishments. The women and children employed in the smaller stores that continue to compete with the big department store are not so well provided. But a much smaller number of women

are affected by conditions in these stores. Furthermore, even these, by order of the Labor Department or following the example of the large stores, are cleaning up their premises. The rickety dark toilet has disappeared except in the dirtiest, most insignificant stores. The custom of asking girls to pile their coats and hats anywhere behind the counter has practically been discontinued. Instead, lockers and hangers have been assigned to the employees. The toilets are cleaner and lighter, soap and towels are often found. Some attempt is being made in almost every fair sized establishment to provide a room in which the girls may eat their noonday meal. As the manager of one of the smallest department stores remarked to the investigator when he displayed a new concrete toilet and washroom — "We're small, but we'll be growing and it pays to let people know that you treat your employees handsomely."

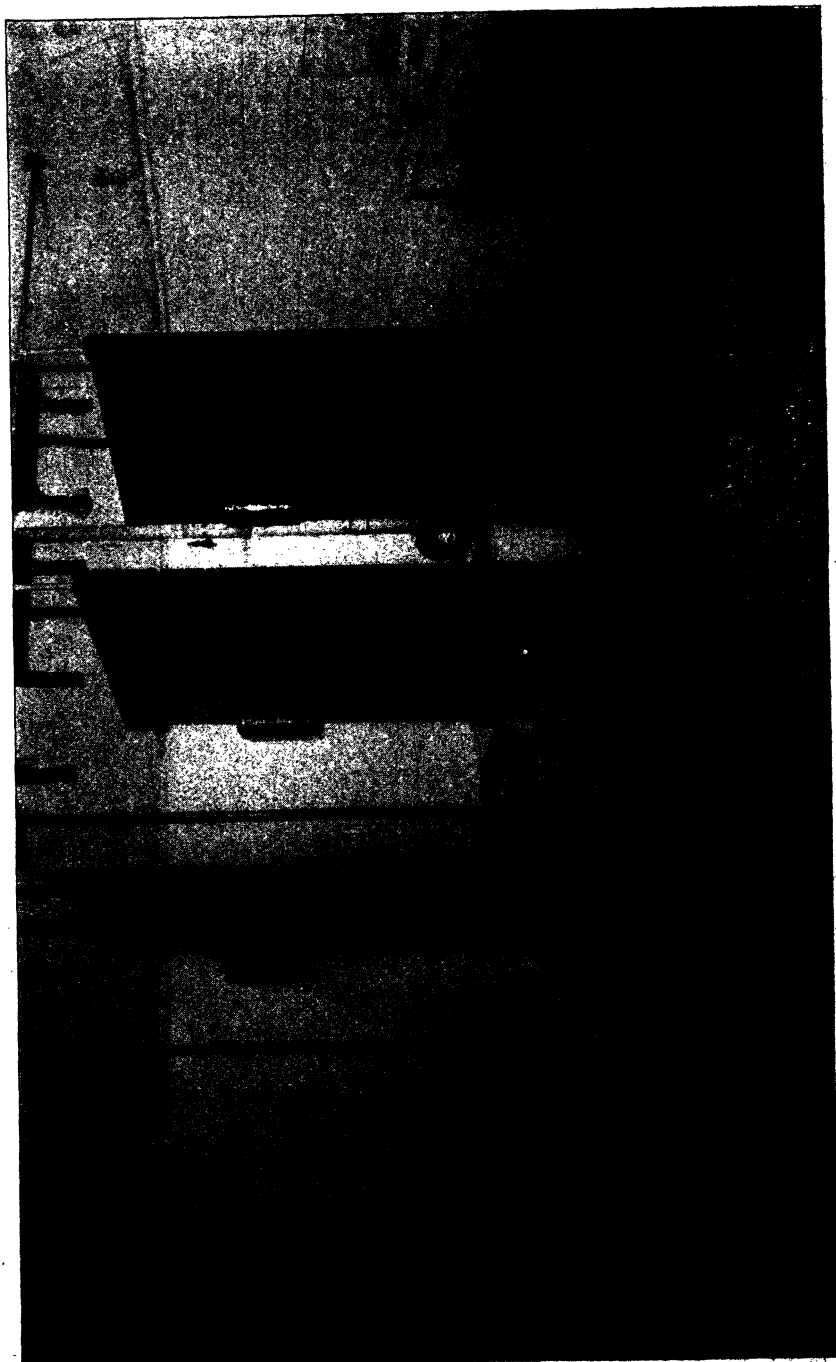
1. Toilet Accommodations.

The girls who work in stores have in some respects more attention paid to their physical welfare than any other class of employees. The sanitary conveniences, for instance, are generally clean and kept in good repair. The following table was compiled from the inspections of our agents and shows the general high standard:

TABLE No. 3.
CLEANLINESS OF TOILET ACCOMMODATIONS ACCORDING TO CHARACTER OF ESTABLISHMENTS.

| | NEW YORK CITY. | | | | UP-STATE. | | | | TOTAL | |
|------------------------|----------------|-------|---------|-------|-------------|-------|---------|-------|----------------|-------|
| | Department. | | 5 & 10. | | Department. | | 5 & 10. | | Dep. & 5 & 10. | |
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Excellent and good | 145 | 85.8 | 38 | 79.1 | 79 | 87.7 | 18 | 75.0 | 280 | 84.5 |
| Poor and dirty | 24 | 14.2 | 10 | 20.9 | 11 | 12.3 | 6 | 25.0 | 51 | 15.5 |
| Total | 169 | 100.0 | 48 | 100.0 | 90 | 100.0 | 24 | 100.0 | 331 | 100.0 |

The rating was determined by the uniform standard used in the Commission's investigations. There is apparently little variation in conditions in the different parts of the state. Moreover, the rating for cleanliness is excellent or good for all kinds of



UNSCREENED TOILETS.

establishments, although the department stores stand slightly higher than the five and ten cent stores. In fact, 85% of accommodations for all stores is reported in excellent or good condition. Less than 1/3 are located in basements. Lighting and ventilation, as well, are adequate in a large percentage of toilet rooms; in 87% the lighting and in 84% the ventilation are good or excellent.

In a few pretentious establishments, however, there was flagrant negligence in regard to the toilets. In one department store employing about 150 females, the toilet room is in the basement. On entering the toilet the investigator was face to face with twelve separate closets none of which was screened by a door. The girls complained bitterly of this lack of privacy. "We're modest in our homes," said one, "but we soon get over that here. It ain't decent and it ought to be fixed."

In another store in which 700 women were employed an investigator who worked in the establishment reports: "I saw two of the toilets to-day. They are very difficult to find; they are dark, with apparently no windows for outside ventilation. The seats are old fashioned, of wood and not clean; the sinks are dirty and there is no soap or towels. One of the toilets is entirely too small and dozens of girls had to wait. The general behind-the-scene effect is dirty and unsanitary." And again, from a second store where an inside investigator was one of seven hundred girls, there comes the following statement: "A smell of unsanitary water closets is especially noticeable. The toilets are in very bad condition, only one out of seven is flushing automatically. Since the closet in the basement is locked (probably for repairs) it is necessary to go to the 6th floor where the overcrowding is fearful."

In some cases the number of toilets is entirely inadequate and obviously this brings with it unmistakable hardship and danger to health. It is fair to state that our investigation was carried on in two of the busiest months of the year, when the accommodations of the store were taxed to their fullest capacity.

TABLE No. 4.

RATIO OF WOMEN TO TOILETS IN 216 STORES AND NUMBER OF WOMEN AFFECTED.

| RATIO OF WOMEN
TO ONE TOILET. | DEPARTMENT
STORES. | | FIVE & TEN CENT
STORES. | | TOTAL. | |
|----------------------------------|-------------------------|------------------------|----------------------------|------------------------|-------------------------|------------------------|
| | Number
of
stores. | Number
of
women. | Number
of
stores. | Number
of
women. | Number
of
stores. | Number
of
women. |
| 25 women and under..... | 111 | 13,129 | 68 | 1,445 | 179 | 14,574 |
| 26 to 40 women..... | 20 | 13,102 | 3 | 290 | 23 | 13,392 |
| 41 to 50 women..... | 6 | 1,946 | ..... | ..... | 6 | 1,946 |
| 51 and over..... | 5 | 6,214 | ..... | ..... | 5 | 6,214 |
| Not specified..... | 2 | 2,252 | ..... | ..... | 2 | 2,252 |
| No toilet..... | 1 | 7 | ..... | ..... | 1 | 7 |
| Total..... | 145 | 36,650 | 71 | 1,735 | 216 | 38,385 |

Although in 179 stores throughout the state, employing 14,574 women, there was an average of 1 toilet for every 25 women employed, these stores were the smallest under inspection. In 23 other stores with only a slightly smaller number of female employees (13,392) there was a proportion of 26 to 40 girls to each toilet. In 6 stores representing 1,946 women and girls the proportion was 40 to 50 females to each toilet and in 5 stores employing 6,214 women the proportion was 1 toilet to 51 women and over. In many of these largest stores the liberal ruling of the Department of Labor (1 toilet to every 50 females in stores employing 1,000 or over) was totally disregarded.

Moreover the ratio of toilets to the number of employees varies greatly in stores of approximately the same size. In two stores where the full number of women employees was practically the same (704 and 703 respectively) the ratio of toilets to female employees in the former was 1 to every 26 women, in the latter 1 to every 71 women. Two large stores, each employing about 2,500 women, had almost as wide a divergence in the ratio of their toilet facilities. In one the proportion was 1 toilet to every 30 females, in the other 1 to every 57 females. It is easy to appreciate the difficulty of increasing the toilet facilities of a store during the Christmas holidays compared with the ease of increasing the labor supply, but it is significant that some stores have prepared themselves for this customary reinforcement in their numbers while others have dealt with it inadequately.

2. *Washing Facilities.*

Like the toilets, 83% of washing facilities inspected were found to be in a clean and sanitary condition. Except in a few unimportant stores the dirty iron sinks have been replaced by white porcelain basins and modern plumbing. Moreover 78% of the stores have provided towels for the comfort of their employees. In fact since a regulation was passed by the New York City Board of Health prohibiting the use of the common towel "in factories and mercantile establishments" several of the large shops provide individual towels and a few others have installed paper towel racks. The roller towel, however, is still found hanging in 93% of the stores which supply towels.

There is one serious complaint to be raised in connection with the washing facilities. This is the lack of hot water in many establishments. It is a grave inconvenience to girls working in a department store not to be able to wash their hands in hot water. They are expected to take care of a certain section of stock and to keep it in order during the day. Every morning boxes or wares are brought down from the stock room covered with dust and it is the duty of the salesgirls to wipe off the shelves, brush up the stock and pack it away neatly. In doing this their hands become coated with grime and their finger-nails become black and dirty. Not only are employees ashamed to wait on customers with dirty hands, but they are scolded and upbraided for carelessness in spotting or staining articles of merchandise. It is unreasonable to expect them to turn from the dirty work of tidying stock to handling white goods or dainty silks without giving them the opportunity of scrubbing their hands in hot suds. Yet there is a firm of wide reputation employing over 1,500 women which does not supply hot water. Another store employing 800 women, two more employing 500 and many others equipped with good toilets and wash rooms, fail to furnish hot water. In all, 64% of the 127 department stores and 85% of the 60 five and ten cent stores about which information was collected fail to make this provision for their employees.

3. *Dressing Rooms and Lockers.*

Ninety-six department stores (66%) and 38 five and ten cent stores (54%) provide dressing rooms or locker rooms for their

employees. In smaller stores such rooms are often connected with the lunch or wash room, coat hangers are hung up on hooks along the wall and a shelf is built in for hats. In the large establishments it is customary to find individual metal lockers arranged in one or several rooms. Usually 2 girls share a locker (each possessing a key) although during the holidays in some stores five or six girls were assigned to the same locker. This overcrowding in the cloak or locker room is resented by the girls far more than overcrowding in the toilets because it directly lengthens their hours in the store.

Nearly 44% of the dressing rooms in the department stores and 60% in five and ten cent stores were found in basements. In many the light was poor and the air was close. In an establishment where over 2,000 women are employed the inspector writes the following description of a basement dressing room:

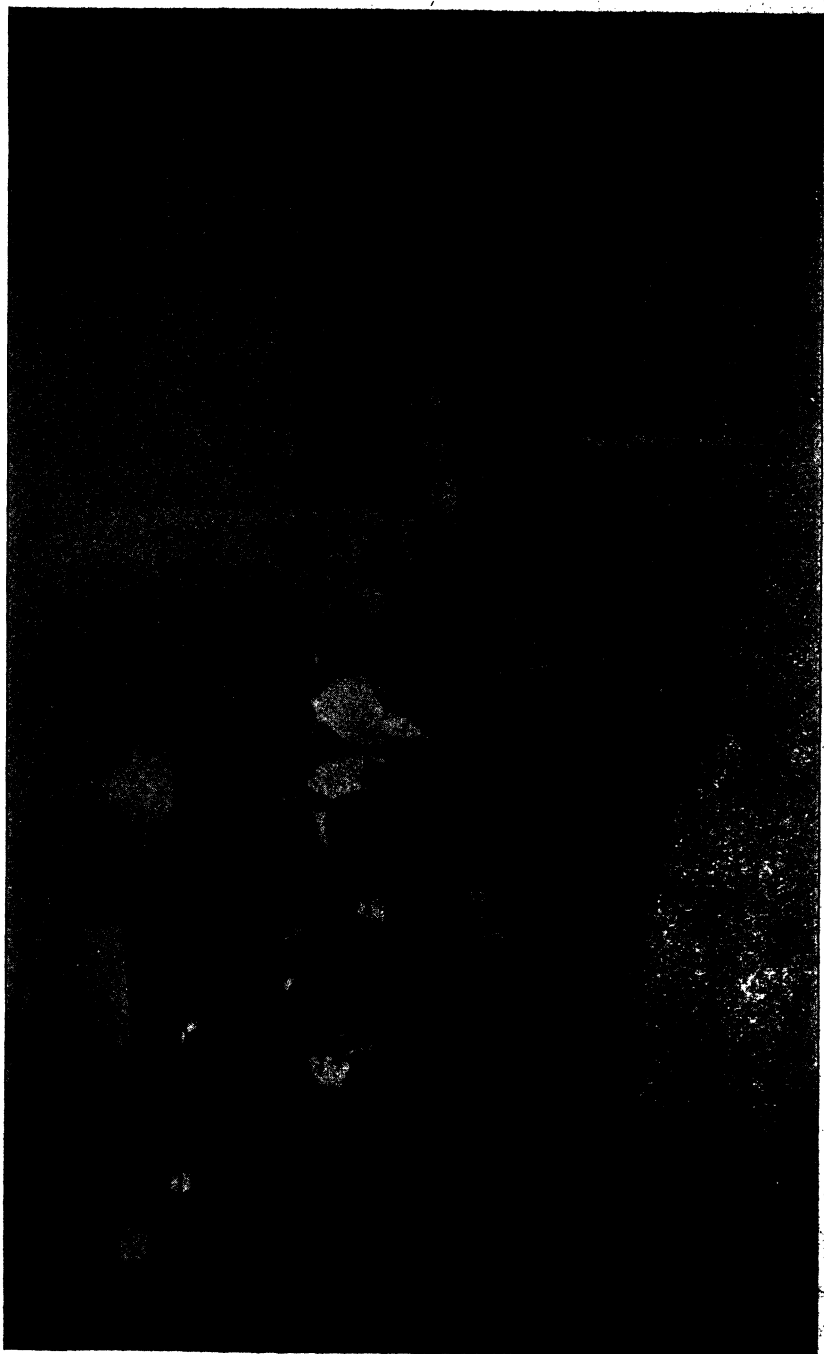
“The dressing rooms are in the basement of the main building. Each section is assigned to some special group of saleswomen. Employees supply their own hangers. Each hook from which a hanger is suspended is numbered to correspond with a saleswoman’s number. Inside each hat this same number is also placed and the hat is stowed on the shelf above the hooks. Some of the sections are very cold and damp and on rainy days the clothes do not have a chance to dry. The maids in attendance complain of severe colds and rheumatism. The steam heat in the coldest rooms had not been turned on at all.”

This report of the inspector is corroborated by the testimony before the Commission of a girl employed in this very store:

Witness — “In the cloak room, it is positively unhuman. I have been crushed almost to death. I went to my department faint and have been taken to the hospital . . . Well, I have myself been in that crush, in that tunnel under the ground when it was suffocating. If anybody had fainted there was no possible way of getting out of it.”

Another witness — “I was in that rush to-night. I was there twenty minutes overtime trying to get my clothes.”

Witness (continuing) — “Everybody’s clothing is hung up one right over the other; I have had my clothes handed to me perfectly wet.”



LUNCH HOUR IN EMPLOYEES' RESTAURANT.

A second inspector shows how another large firm employing about 1,500 women has attempted to improve the basement locker room:

“A rainy day room is provided for the girls. This room adjoins the dressing rooms in the basement. It is supplied with hot air and other appliances for drying clothes. On rainy days girls are allowed time off to dry their clothes if they are wet.”

However, although dressing rooms were found to be overcrowded at this time of the year, insufficiently lighted and unsuitably located in some instances, yet 93% of the number were clean or moderately well cared for.

4. *Lunch Rooms.*

The lunch room facilities afforded by mercantile establishments range from the cramped underground lunch rooms furnished with table and gas stove, usually found in the small stores, to the huge restaurants of big department stores, where several thousand employees may be accommodated and where a wide variety of food may be purchased at cost price. About half the stores investigated furnish some kind of a lunch room for the use of their employees.

Of the 77 department stores which have lunch rooms, 65 have them located above ground, and of the 32 five and ten cent stores which make this provision, 16 (exactly one-half) are on or above street level.

In the small stores the lunch room is more or less of a makeshift, and is often found in the basement or tucked away in some dark corner. In one shop, for instance, where 150 girls are employed, the lunch room is under the sidewalk. The ventilators cannot be opened on account of the dust from the street, and even when closed the dust can filter through so that it is necessary to keep the food covered. However, many small firms, despite limited space and lack of opportunity, are making a distinct effort to furnish accommodation for their girls during the noon hour.

In the big department stores the employees' dining room is as distinct an institution as the customers' restaurant. Many stores

have cheerful rooms where an appetizing meal may be obtained for a few pennies. In other stores the tables are littered with dirty plates and platters; the crockery is half washed and sticky; the room is overcrowded with noisy clamoring girls who are waiting in line for their food.

TABLE No. 5.
CLEANLINESS OF LUNCH ROOMS.

| CLEANLINESS. | DEPARTMENT STORES. | | FIVE & TEN CENT STORES. | | TOTAL. | |
|------------------------|--------------------|------------------|-------------------------|------------------|-------------------|------------------|
| | Number of stores. | Number of women. | Number of stores. | Number of women. | Number of stores. | Number of women. |
| Excellent or good..... | 68 | 32,658 | 27 | 1,008 | 95 | 33,666 |
| Fair or dirty..... | 7 | 1,529 | 5 | 292 | 12 | 1,821 |
| Unknown..... | 2 | 259 | ..... | ..... | 2 | 259 |
| Total..... | 77 | 34,446 | 32 | 1,300 | 109 | 35,746 |
| No lunch rooms..... | 68 | 2,204 | 39 | 435 | 107 | 2,649 |
| Total..... | 145 | 36,650 | 71 | 1,735 | 216 | 38,385 |

According to the above table it is evident that in the large department stores the lunch rooms are usually clean and well kept. In the smaller stores, where no special staff is employed to take charge of the lunch rooms, the rating is somewhat lower. Nevertheless our inspectors reported rooms in large shops where no attention was given either to comfort or neatness.

In one room described there was too much crowding, and consequent noise to permit anyone to rest. The girls ate their lunches and left the place at once. "The only way to get any rest or quiet at noon," said one young woman, "is to go to the customers' restaurant and pay for our lunch there. Then we may sit comfortably and feel a little less tired afterwards. But the lunch room for the girls is fit only for those who want to rush in, swallow their food like animals and rush out again."

There is one thing which provokes dissatisfaction even more than a cluttered uncomfortable lunch room. This is the custom in certain stores of making it practically obligatory for the girls to eat their luncheon in the employees' dining room. In one store, if they wish to go home or take luncheon outside the store, they lose 10 or 15 minutes out of the noon recess because they

are compelled to go to the top floor and give their time there to the timekeeper on going out and on coming back. Although the lunch room in this store is bright and attractive, these good points are overshadowed by the policy of the firm in constraining the girls to eat there.

The lunch room is not required by law. Wherever it is instituted for the benefit of the employees to serve them with wholesome food at cost and to provide them a clean pleasant room where they may eat together and chat together, such a policy is repaid by improved health and by stronger allegiance to their employer.

5. *Rest Rooms and Welfare Work.*

The factory law requires that in factories where females are employed either a dressing or emergency room shall be provided for their use. Yet in mercantile establishments where there is always a very large percentage of female labor, where the total weekly hours are often longer than factory hours, and where the saleswomen must be neater in appearance than factory workers, there is no such provision in the law.

It is true that many employers have of their own accord seen the need of this accommodation. Practically all the large houses in New York City and several in other cities are equipped with emergency rooms, where a girl may lie down for a few hours without loss of pay. In some stores she may consult a physician free of charge, and there is a trained nurse in attendance and medicine without expense. In certain stores there is even a dentist and a chiropodist. In an increasing number of stores a rest room is furnished where employees may read and enjoy themselves during their spare moments; in some cases roof gardens, circulating libraries, classes in salesmanship, and other devices for the amusement and welfare of employees are supplied.

In one of the best known houses children who look ill-nourished are weighed at regular intervals, and if they are losing weight, they are given advice as to diet and manner of living. A sickly, undersized girl or boy receives free checks to be exchanged for egg and milk drinks at the soda fountain.

One firm maintains for the use of the women and children a special club house where there are lunch and recreation rooms.

The children are required to attend lessons at fixed hours, and there are classes in first aid to the injured, military drill for the boys, and lessons in cooking, millinery and sewing for the girls. Membership in the clubs is optional, but they are largely attended.

Another store has a large and sunny roof garden. One-half of the room is enclosed in glass where the girls may settle back in comfortable rocking chairs and read the magazines scattered about on the tables; the other half is a wide open space with a playground for the younger girls.

Such conditions are found not only in stores which cater to a high class of trade; some of the more popular shops have similar arrangements. But while many houses voluntarily make this provision, many still fail to do so. No adequate reasons exist why mercantile establishments should not be required by law to provide a proper dressing or rest room for their women employees.

Whenever a girl is taken ill, in a store in which there is no rest room, she must stay at her place in discomfort or go home and lose her pay; otherwise she must prop herself up as comfortably as she can in the customers' waiting room or in some office.

In one store for example, where about 160 women are at work, a hard bench outside the customers' toilet is the only provision for a girl who is unwell, but not seriously ill. People are continually passing in and out of the room, and it is almost impossible to obtain any rest or quiet. Yet the girls must endure these hardships until they feel better or be docked a half day's pay for absence. In a still larger store, an inside investigator reports:

“In one corner a railing separates a small space above which hangs the sign that this is the female waiting room and no males are allowed in. The girls sit on hard seats in full view of whoever passes. The room will hold about twenty girls sitting next to each other on these benches.”

The welfare work of some of the leading merchants has been described at length in this report as it is our intention to give full credit to their activities. In many instances where this so-called “welfare work” has been instituted it is found to be a sound business proposition. The manager of one of the department stores described above was much averse to calling the ar-

rangements made for the women and girls in his store "welfare work." "This is not a charitable enterprise," he remonstrated, "it is solid business principle and every cent pays." Not only does it pay to advertise a "model establishment," but it pays to supply employees with comfortable surroundings, so that neither illness nor physical discomfort may interfere with their efficiency. Furthermore, as a result of such consideration and assistance a certain "esprit de corps" is created among the employees that distinctly enhances their value. Welfare work so conducted is on a sound basis. The employers make the necessary outlay in order to promote the industrial efficiency of their working force.

In other cases the employers take no comprehensive view of their employees' best interest. There are merchants who, with one hand, ostentatiously shower benefits, such as lunch rooms, club houses and infirmaries, upon their employees and with the other hand treat these same girls with marked injustice. They lengthen hours of labor whenever it suits their convenience, enforce a system of unjust fines, and reduce the wages of their employees to the lowest possible point. Under these conditions the showy welfare features cannot compensate for such fundamental evils. The girls themselves are awake to the inconsistency of such treatment. In many quarters, consequently, welfare efforts have been sharply criticized and, at times, with much justice.

Indeed the mere provision of such conveniences should not conceal the fact that in rush seasons the girls are oftentimes too busy to avail themselves of the opportunities offered. Of what good is a rest room, for instance, if one has no time to rest? Our investigators very often found these rooms unoccupied. The girls told them that they were entirely too busy to leave their work. Sometimes the rest room is inconveniently located. It takes the girls too long to reach it, and some say they never use it. Obviously the value of the experiment lies entirely in the amount of use that is made of the equipment.

But even though all the provisions above described are made and their use encouraged, the physical and nervous strain of mercantile work must not be overlooked or minimized. Rest rooms, medical care and other elaborate features can at best only repair the damage done in the course of the work. They should not

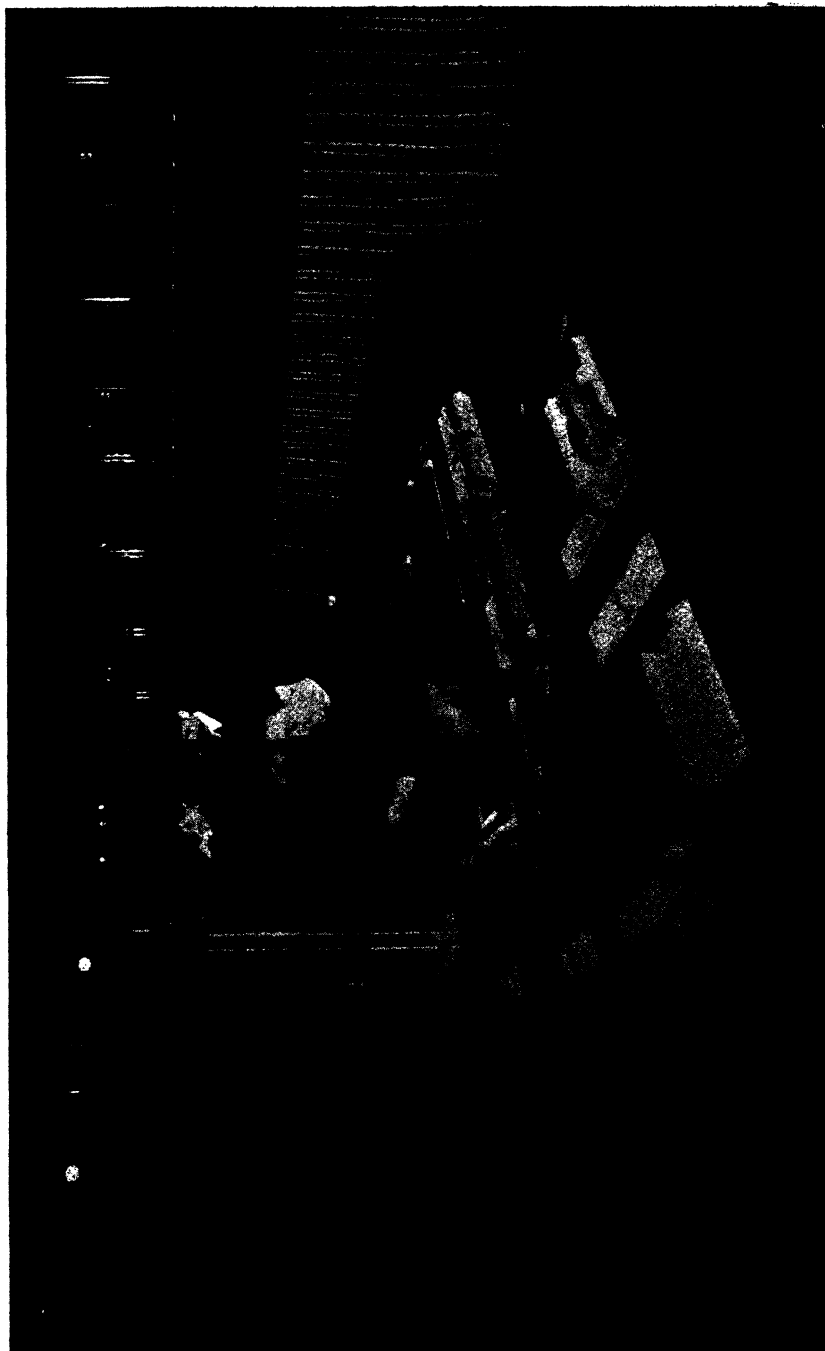
obscure the need for avoiding rather than relieving the effect of the fundamental hardships of the occupation. What the exactions of the work are and to what extent they may affect the health of the workers will be discussed in the following chapter.

V. THE HARDSHIPS OF THE OCCUPATION: ITS DEMANDS ON THE WORKERS.

Employment in a mercantile establishment is commonly supposed to be light and easy work compared with that in a factory. But, according to the workers themselves, it is far more exhausting than seems to be the case. The rush and speeding of factory work is well known and has often been described in detail; far less notice has been given to the tax upon the strength and nervous energy of the department store girls. While taking pride in their superior social position, the store girls realize that at certain seasons of the year their work is more fatiguing than factory employment. Emily, for instance, is typical of many girls whose ambition it is to give up "operating a machine" and become a saleswoman. Emily confided to the inspector that she was glad her work behind the counter at Christmas was only temporary because she was "dead." Never had she been so tired in the factory. "It was all right so long as we weren't busy," she added, "but when the customers began coming on I realized how terrible it was!"

The demands on a store girl's physical endurance vary according to the kind of work she does. For the saleswoman, who constituted 66% of the whole number of girls and women employed, it can be said, in general, that long hours of standing, poor ventilation, close application to work, despite constant interruption and distraction, and excessive seasonal overtime are characteristic of their occupation. They must always be neat in appearance and on their best behavior. They are always on duty and have to preserve an even temper in meeting the tastes and whims of customers of all kinds. Therefore, while a girl may be almost dropping from weariness or sickness she must always assume a polite responsive manner towards all with whom she comes in contact:

"The incessant jumping from one person to another (at the same time keeping strict attention to saleslips); the



GOOD TYPE SEAT PLACED INSIDE AISLE COUNTER.
Girl Is Protected From Jostling Crowds.



continual bending over to pull out stock; the necessity of always being pleasant in the midst of the rush, and of course, standing sometimes for $9\frac{1}{4}$ hours a day, all this," writes a department store employee, "wears out the endurance of the worker."

The girls employed in the offices of the stores (16%) do not have to stand, nor are they subjected to the particular strain of work at a counter. But they have to give the exacting attention common to all office work, and their duties are prolonged from half an hour to an hour later than in other business offices. Moreover many work at night several times a week during certain periods of the year. In a number of stores they work in inner rooms or in basements where artificial light is needed at all times. Included in this class are cashiers who handle large sums of money and are therefore required to exercise extraordinary care and precaution at every transaction.

The girls in the packing and shipping departments (3.8%) stand practically all day long as they wrap, tie and distribute the unwieldy bundles which pile up before them. Their work is hardest in the late afternoons and often lasts till after all the other women employees have left the premises.

Thus in the various departments the work has certain common characteristics,—much standing, bad air and nervous tension. These are found in varying degrees in practically all stores, and constitute the most serious demands on the strength and endurance of department store employees. The saleswomen have received the most detailed consideration, since they outnumber the others so greatly and since their work is on the whole most exacting.

1. *Standing.*

Constant standing is without question the greatest hardship. A saleswoman has to be on her feet practically the whole day. She is able to sit down for only a few moments at infrequent intervals. In the busiest hours of the day, in the rush season preceding Christmas and whenever special sales are held, there is little opportunity to rest. In fact, the testimony of many girls proves that on some days they almost never have a chance to sit

down. An investigator employed in a popular store at Christmas writes:

"Sat down only twice to-day and for not more than a minute each time. There are 11 girls at the counter now and 4 seats, but when opened the seats are in the way because it is so fearfully crowded behind the counter on account of the extra stock and the extra girls. We bump each other, and block each other and tread upon each other's sore feet all the time."

Almost without exception the girls complain of the extreme discomfort and fatigue that come from continuous standing. Swollen and aching feet and broken arches result. The pain at times is acute and reaches up to the thighs. Behind the counter during the busy season there is a continual repetition of the complaint: "Oh, my feet," and of warnings not to step on them.

Bessie, employed at the book counter in X's, complained bitterly of the pain in her feet: "They just burn," she said, "I don't believe that I can ever stand on them again."

In another large store two girls were waiting for the elevator, each standing alternately on one foot and then on the other. "I'm wasting part of my lunch hour," said one of the girls, "but I'd rather be shot than walk down the stairs."

"Yes," agreed her companion, "I couldn't go up and down those stairs if I tried, for every step I take I seem to shake, I'm so tired."

When a girl works behind a counter, she can occasionally lean against the stock case for rest. But the girl who stands at an aisle counter or at a table must endure the continued strain practically unrelieved all day. What this means to a girl, who may have to stand 70 to 80 hours during the Christmas week, is revealed in the words of one of the employees of a large department store:

"One day I was not relieved at night for supper till nearly 8 P. M., after demonstrating dolls at an aisle counter all day. I was so exhausted that I finally broke down and cried from fatigue. The millinery buyer came and asked me what was the matter and I told him. I said I had not sat down all day and if I could only go off the floor a few minutes I could rest and that would stop my crying."



POOR TYPE SEAT AT AISLE COUNTER.



Such instances as these are, of course, more frequent and flagrant during the Christmas holidays. But, while the hardships are particularly aggravated at that time, even in the ordinary course of work many girls have literally no time to sit down. Girl after girl told the inspectors who visited the store in early fall that they were "too busy to notice" whether they had seats or not. In testifying before the Commission one girl relevantly answered the inquiry as to whether employees were "able to sit down during the day." "Well!" she said, "most of the girls don't have much time to sit down. Where you have a bargain counter you never have a chance to sit."

2. *Use of Seats.*

The question naturally arises whether the mercantile law does not provide a remedy in requiring one seat for every three women employed. The law is usually obeyed and seats or stools are provided in correct proportion. But in practice the law is almost useless. Either, as we have seen, the girl is too busy to sit down or else the use of seats is for the most part forbidden by unwritten law or by explicit directions from floorwalkers or managers. They try to impress the salesgirls with the idea that it isn't "businesslike" to sit down and that only by standing to receive customers will trade be attracted to the counter. In one store the girls remarked significantly,—“We can sit down, but in most departments, if you're wise, it's better not to!” Several girls testified in regard to seating arrangements at a private hearing on mercantile establishments before the Commission. One witness gave the following evidence about a store employing over 500 women and girls:

“Q. Is there any trouble about using the seats that they furnish the salesclerks with?

A. Well, there is and there is not. You can sit down, but sometimes if they see you sitting they don't like the idea.

Q. Do they tell you that they don't like the idea?

A. Yes, they will.

Q. Did they ever say that to you?

A. Last week they said there was too much sitting in the departments and half the time there was nobody sitting at all and nobody at the counter.

Q. Don't you think that is the fault of the men on the floor?

A. No, they get their orders from the superintendent.

Q. Do they post these orders?

A. No, sir.

Q. Do they have them printed?

A. No, sir, but we saw the superintendent talking to the floorwalker and then the floorwalker would come around and tell us not to sit."

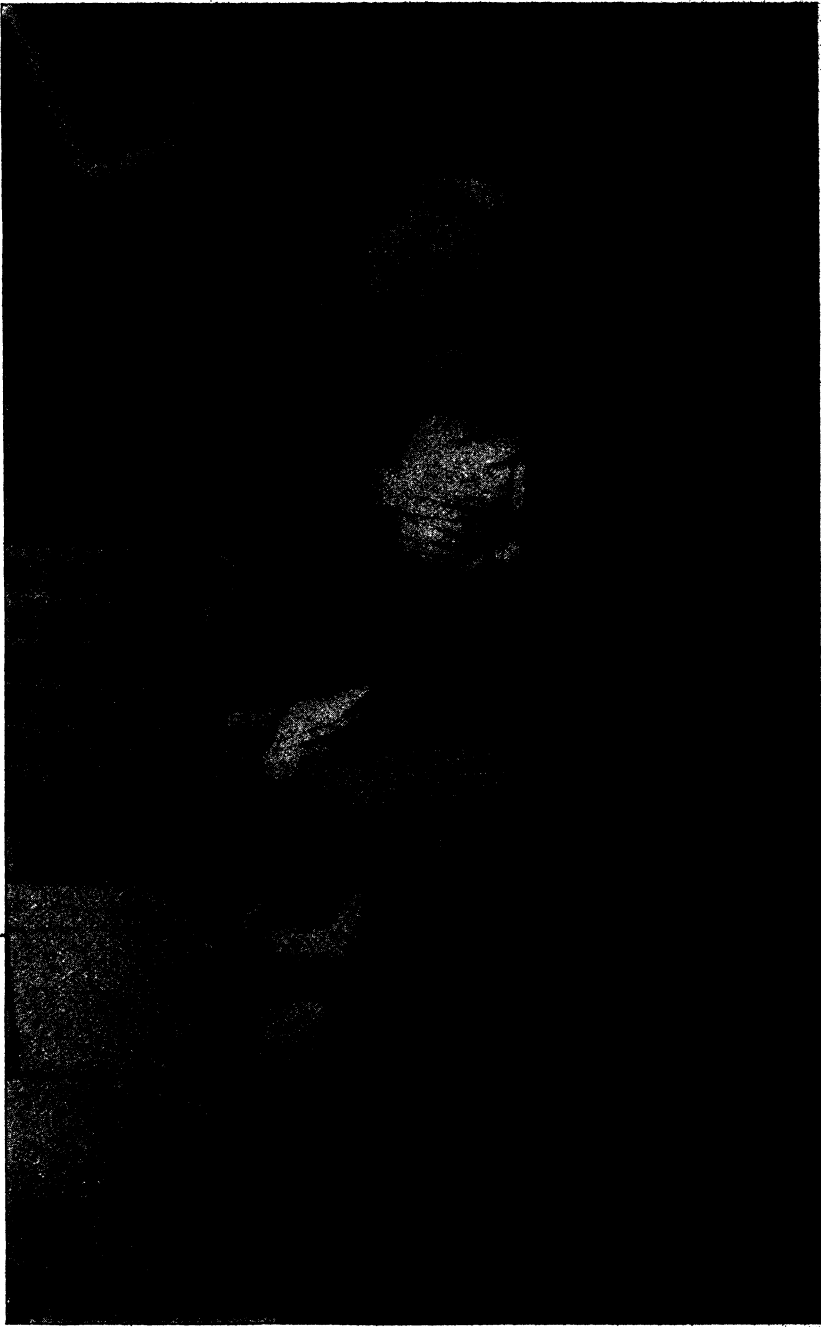
Again, if an aisle manager sees that a girl has leisure to sit down he will either "make" work for her or else will move her to another counter, leaving the remaining girls to shoulder her work.

"If the head of stock would let us sit only for a minute," said a girl at the notion counter of a big store, "it would rest us for hours. But if we sit a second she is after us, saying there is something to be done, and lots of times there isn't a thing. It is only her way of telling us not to sit down."

"Girls in my department," said one buyer, nervously, when asked why so many girls were standing near seats, "never sit in the morning. In the afternoon about four they sit!"

The floorwalker and buyer are generally given extensive authority in their own departments and the heads of many firms shift upon them all responsibility as to the use of seats. Certain fair-minded employers have, however, checked this over-rigorous control of the department managers by declaring that "any floorwalker, buyer or head of stock who prohibits the use of seats will be dismissed."

Moreover, the girl placed at an aisle counter or at a table may actually be without a seat. Her third of a seat may be behind a neighboring counter or may be so far away that it is absolutely inaccessible. At one store, for example, the girls at the aisle counters (silverware, trinkets and gloves) say that they are told they may go behind other counters and sit if they are tired. "But," remarked one girl, sarcastically, "I see us tryin' it."



WRAPPING AND SORTING BUNDLES.
Bending and Lifting Heavy Bundles.



In a few stores, where female labor is employed in the shipping and packing departments, it is seldom that seats are provided for the girls who wrap and tie up the bundles. Although the majority of establishments now employ men only in the packing and shipping rooms, our inspectors reported 23 department stores (20 in New York City) which still continue to use female labor in these departments. The total number of women and girls who perform such work is 1,382, the largest number in a single store is 365.

In one store, where about 100 girls are employed in the delivery and transfer departments, all of them (aside from a few office employees) do their work in a standing position. Four young girls in the delivery department (two under 16 and two barely 17 years old) do perhaps the hardest work in the store. They receive parcels for delivery from all over the store. The bundles are carried to them on endless belts, and the girls distribute these parcels (except very large ones) into twelve chutes representing different routes which lead to the shipping rooms on the floor below. The distance between the chutes and the girls is from 6 to 12 feet, and the girls work with almost incredible quickness. The inspector timed one girl and found that in one minute she distributed 42 packages; another time she distributed 36 parcels in one minute. Yet this exhausting work is done wholly in a standing position and the girls are often obliged to remain at their posts during rush seasons till long after 6 o'clock.

In regard to a second store the inspector reports:

“A number of packers in the rear of the 3rd and 1st floors were very much overworked, their work extending until after the closing hour. The work is done in a standing position, and there was not a single seat for a possible few minutes' rest.”

And in still another establishment where several girls are employed wrapping bundles in the delivery room, the superintendent told an inspector, who inquired as to the lack of seats, that “they had benches, only he didn't know where they were.”

There can be no doubt that the enforcement of the section of the labor law which permits women to use the seats “at such times

and to such extent as may be necessary for the preservation of their health," is a baffling task for even the most conscientious mercantile inspector. The only legal evidence of violation that he can obtain is a statement from an employee that she is forbidden to use a seat, even if it is provided. Naturally enough a girl will not risk her position to give this testimony, though she is suffering acutely from constant standing. The mercantile inspector has been known to take cases into court in the hope that the girls would testify truthfully, only to find that his witnesses failed him at the critical moment.

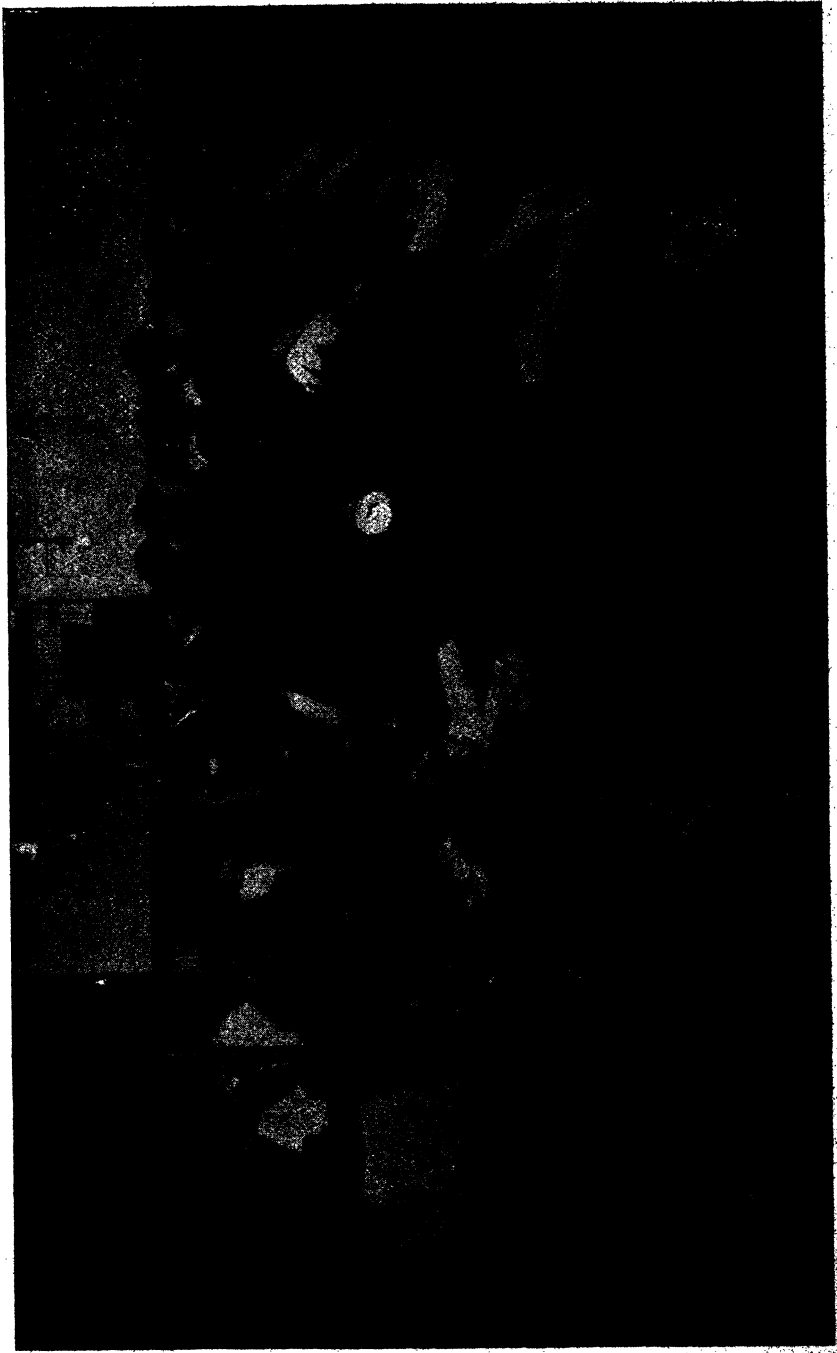
3. *Injury Due to Standing.*

The statements of physicians on the injury to women's health caused by prolonged hours of standing have been set forth in no uncertain words. The defense of the Illinois ten hour law regulating the employment of women in department stores (recently declared constitutional by the Supreme Court of that State*) was largely based on the testimony of physicians that such hours of standing unwarrantedly jeopardize a woman's health. These physicians, both English and American, were in contact through their practice with girls and women employed as saleswomen. They were unanimous in the opinion that when women are required to work in a standing position for many hours a day, it is unquestionably injurious to the female organs and reproductive system. The following quotation taken from the appendix to the Brief makes this point clear:

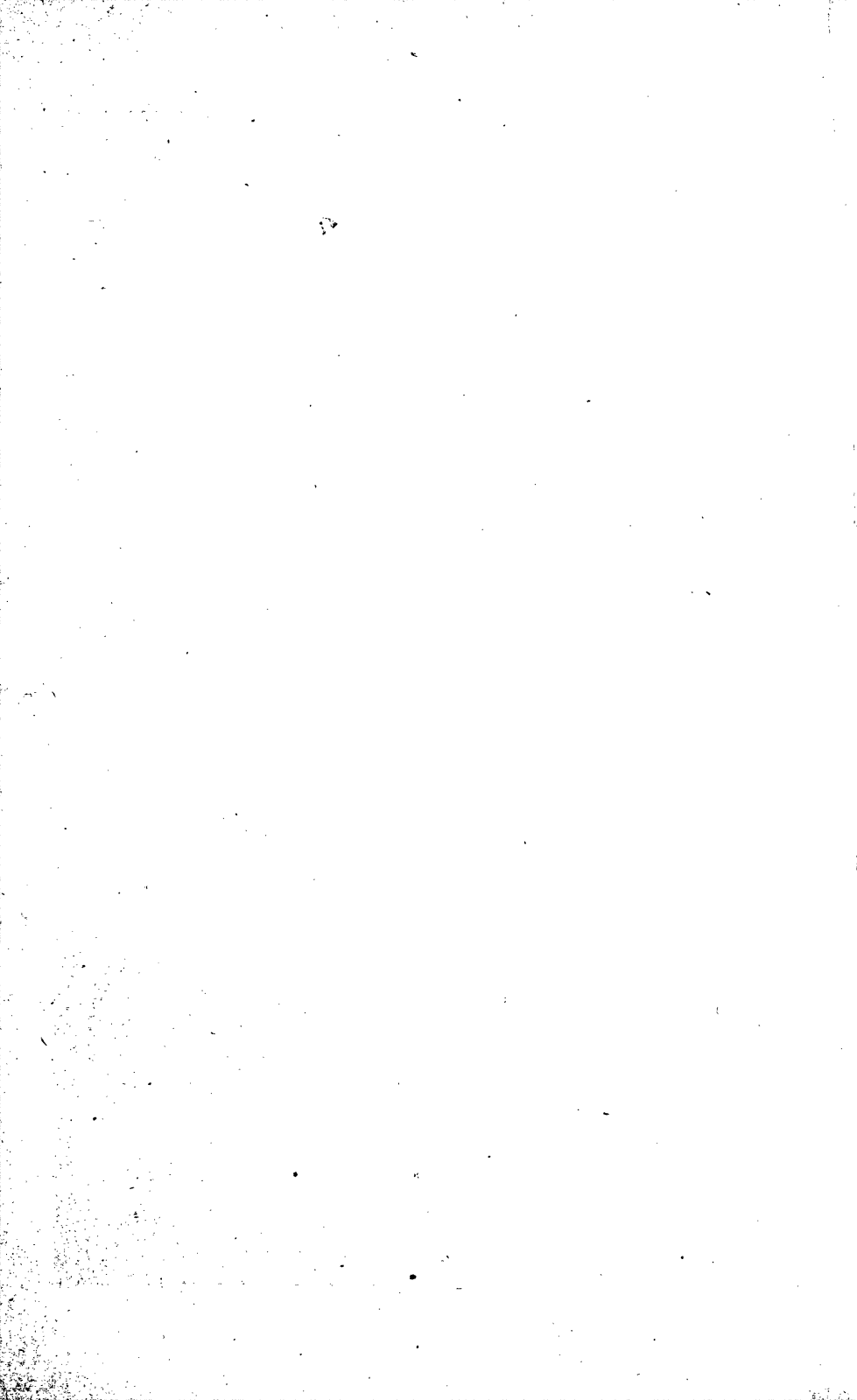
"Continuous standing for hours together is a strain especially upon the arch of the feet and the ankle joints; a cause of weary spine and spinal curvature, favoring also pelvic fullness, and in the female sex, productive of derangements of the uterine functions and of uterine displacements." (Page 28.)

"The attitude of standing, if maintained for any length of time, is quite as fatiguing as, and probably more injurious than, movements that involve more muscular effort." (Page 12.)

* In the Supreme Court of the State of Illinois, *People v. Elerding*, Feb., 1912.



GIRLS IN A PACKING AND SHIPPING DEPARTMENT.
They Stand at Their Work.



“The long hours which shop girls work and the conditions under which they do their work are injurious to their constitutions. Prolonged standing, long hours, and want of proper sanitary accommodations lead to ailments affecting the bladder, bowels, uterus, nervous, vascular (blood) and muscular systems. These ailments are evidenced by the legs becoming swelled with fluid, varicose veins appearing in the lower extremities and muscular pains and weakness being felt from the waist to the soles of the feet. The nervous system is seriously injured by the undue strain which is put upon all the organs of the body. Facial neuralgia, spinal neuralgia, and headache are very common complaints. Anaemia (popularly speaking, poverty of the blood) will be found in the majority of shop women. This arises from long hours, close confinement, and long intervals between meals, with consequent disturbance of the digestive and assimilative functions.” (Page 22.)

The consensus of opinion seems to be that “it has a very grave effect upon the generative organs of women, entailing a great deal of suffering and also injuring a very large body of them permanently. It is the prolonged hours and not being allowed to sit down.” (Page 27.)

Moreover the effect on young and physically undeveloped girls is even more serious than on older women, for injuries to these organs during girlhood may affect a woman for the rest of her life.

The effect upon the feet is given specifically:

“Standing occupations naturally involve the feet and legs in greatest strain, and more especially the feet. In consequence we see developing, during the adolescent years, that condition known as weak and flat foot. This frequently occurs in the adult also from causes of similar nature, but only too frequently the result of conditions and weakening which must be attributed to the period of active growth.

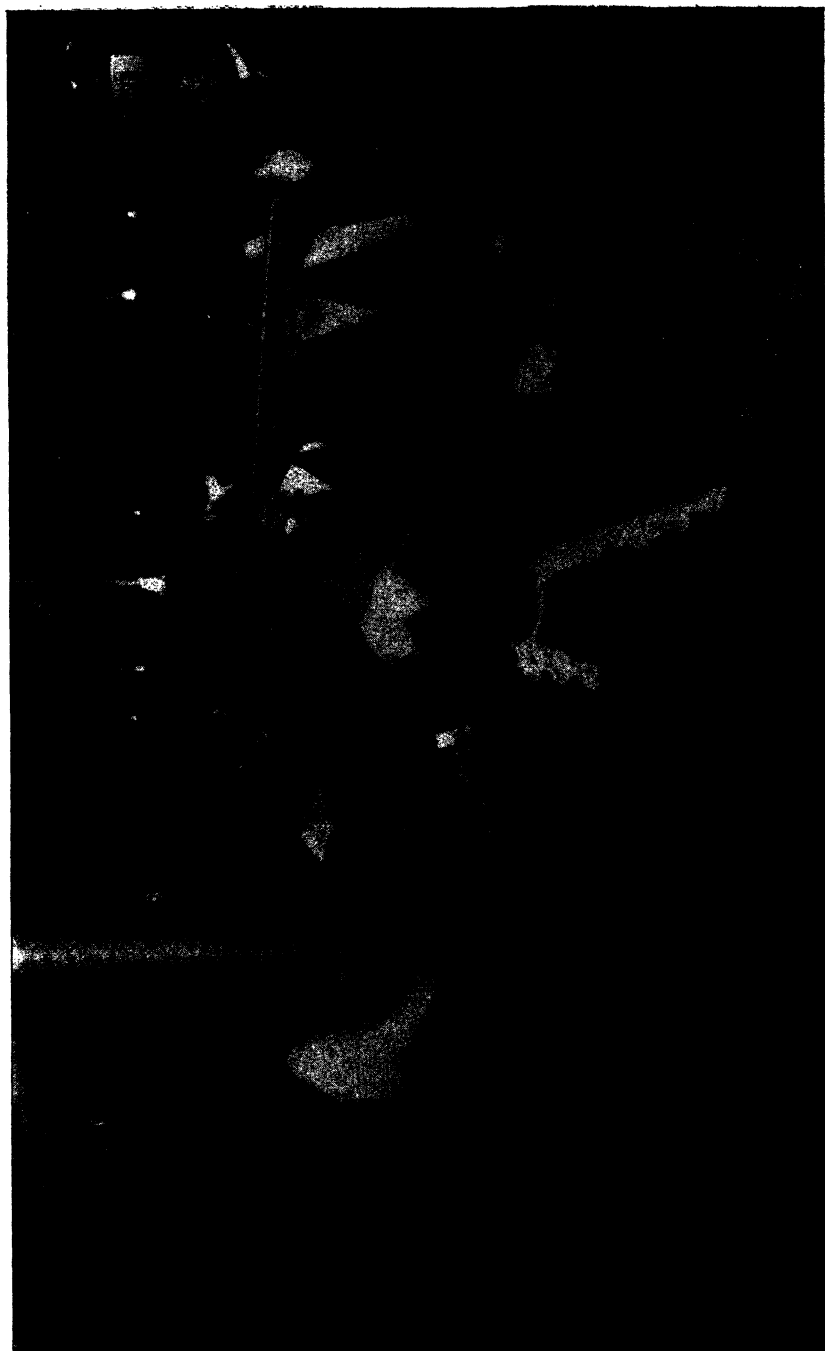
I doubt whether it is generally realized how frequently such conditions are met as those to which I have just referred.” (Page 19.)

Mercantile employers apparently have failed to appreciate the hardships and dangers that come from too long standing. As we have seen, many practically prohibit the use of seats. They have not given serious attention to the prevention of over-fatigue in their employees. It is recognized in the case of telephone operators that they must be given "time off" every morning and afternoon to relax and to recuperate. It is quite as essential that a salesgirl who stands all day should be cared for in the same way. Particularly in the busy seasons managers are inclined to make undue demands of their employees without proper health precautions. It is true that in most stores girls can obtain permission from the aisle manager to leave their counters for brief periods in the morning and afternoon. But during rush seasons permission is often refused or given grudgingly, and the time allowed is only enough to reach the toilet rooms and return. The floor cashiers find it more difficult to leave their posts, and cases were known in which they were relieved only at luncheon time. In no store was any system of adequate "relief periods" described to our investigators, similar to those instituted by the telephone companies, and allowed as part of the day's schedule.

4. *Defective Ventilation.*

Another hardship connected with mercantile work is the bad air in most stores, due to defective ventilation. The proper ventilation of rooms of such large capacity, containing often thousands at a time, is admittedly a complex engineering problem, comparable in difficulty only to the ventilation of schools and theatres. Complaints are frequent even from the shopping public who remain within the store only a few hours at most. Therefore it is not surprising that the girls, in their places from eight o'clock in the morning till six at night, grumble about the dusty, close atmosphere or about drafts which are particularly noticeable in certain exposed positions.

The salesgirls who work at counters close to the doors are often subjected to the rigors of the winter weather, in a way that the shoppers, clad in coat and hat, can scarcely realize. Whenever the doors open and close there is a current of cold air from the street. Some of the best stores have met this difficulty by heating



A BUSY DAY IN PACKING DEPARTMENT.
Notice the Presence of Young Girls.



the entrance vestibules to a high temperature. In others the doorways are like public thoroughfares and during the busy hours of the day the women at nearby counters are constantly exposed to chilly drafts.

At one store where a girl was stationed at a center counter directly opposite the door, she said to the inspector in a hoarse voice:

"We catch such terrible colds standing here. I know a girl got so sick she had to give up her work and stay home. I have a cold in my throat and it's going into my lungs."

This complaint is typical of many others. "As soon as I get over one cold the next one begins," is heard from girl after girl.

In some stores glass shields or screens have been erected, but they are usually not high enough to check the draft, and as one woman remarked:

"It's worse when it comes down on your head like that. I have had neuralgia in my head since November."

A few managers provide sweaters for the employees who are placed in these exposed positions. But often the girls are too timid to ask for such protection, and accordingly the matter is overlooked. For example an inside investigator, employed in one large store, writes:

"Mrs. H. and I were posted near the open subway door. I was out of the draft, but Mrs. H. was so cold that her arms were blue up to the elbow. She had on a waist with short sleeves. The store usually provides sweaters for girls working near outside doors, but Mrs. H. was too frightened to ask for one."

Likewise, elevator shafts cause sudden gusts of air to blow down upon the girls. The following testimony before the Commission reveals a condition which exists in many stores:

Q. Where were you working in Y's?

A. Down in the basement, right near an elevator, and I caught my death of cold, my doctor told me I was going into consumption. Through the kindness of a customer I made the change to X's.

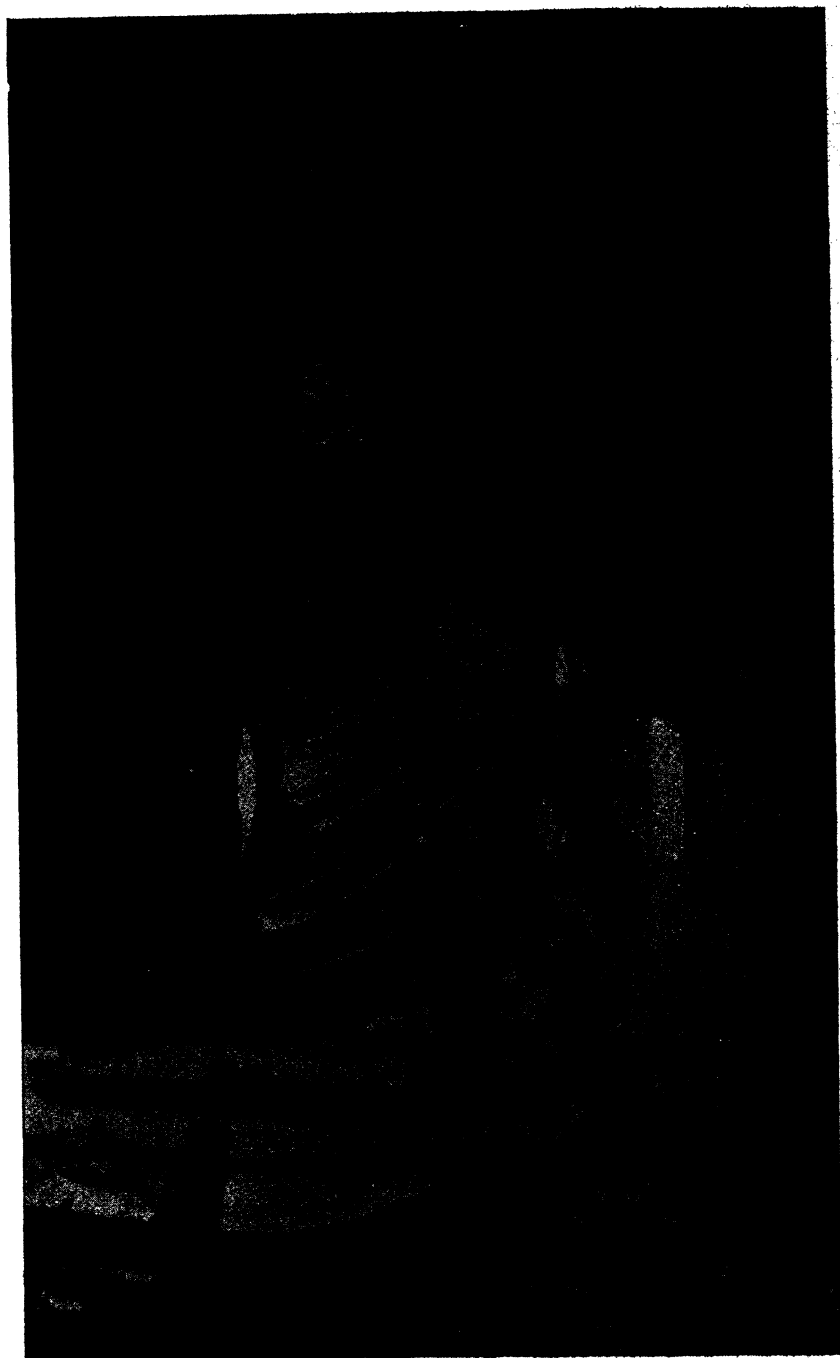
On the whole this particular hardship occurring wherever girls are placed near doors, subway entrances or elevators, has not received the attention it deserves.

Aside from the dangers and discomfort of working in these cold drafts, some girls find that the vitiated air, common throughout the whole store, has a bad effect upon their health. Even where an effort is made to keep the air fresh and free from dust, it is difficult to maintain conditions which are not harmful to the employees. One investigator comments as follows on the ventilation in a mammoth store crowded with shoppers and extra workers at Christmas time:

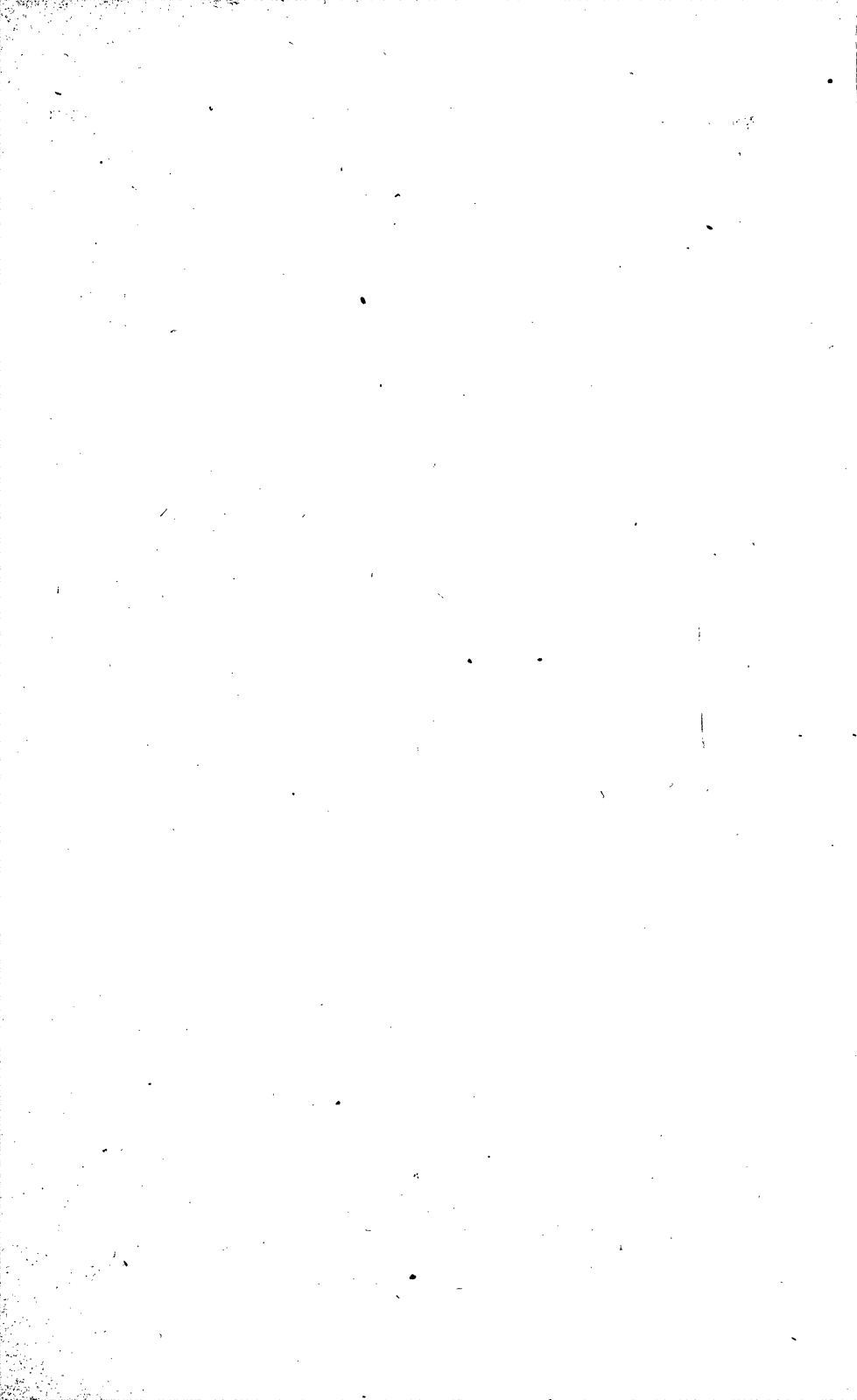
“While the ventilation is apt to be good, toward night a great deal of dust arises. My throat aches badly and both Mrs. K. and Mrs. A. complain that the dust irritates their throats.”

Especially in basements the failure to provide enough fresh air is unmistakeable even without scientific tests of the quality of the air. Though fresh air is pumped into some basements from shafts reaching to the roof, it is often not distributed evenly throughout the basement and certain parts of the room may be entirely unaffected. Or again the current of air through these flues may be so strong and cold, instead of being properly heated, that a condition exists similar to that described above. In one sub-basement the openings of the air shafts were stopped up with cardboard because the girls complained bitterly of the chilly drafts. Other basements are ventilated by openings at the street level and dust and dirt from the thoroughfares sift down into the store. The goods which are sold in the basement are usually of such a kind (kitchen ware, china, hardware, etc.) that they are not harmed by the dust. But it is injurious to the human beings who are required to sell these articles in basements all day long.

The number of persons who are obliged to spend their daylight hours wholly in artificially illuminated basements was discovered by our inquiry. We found that 5,409 persons were working in basements and 543 persons in sub-basements. Incidentally it may be remarked that although these premises are by courtesy called basements, they are entirely below street level and therefore really cellars.



A BASEMENT TUBE ROOM.



The nature of the work performed by these 6,000 persons in basements and sub-basements differs in various establishments. A few of the big stores utilize a portion of the basement space as sales departments, and station male and female clerks behind the counters. In others the only people assigned to basement quarters are the "dead help," i. e., those employed in the pneumatic tube rooms, the bureau of adjustment, the shipping and packing departments, etc. Concerning a bureau of adjustment located in a sub-basement, the inspector reports:

"Notwithstanding that air is pumped into the sub-basement through shafts reaching to the roof of the building, the atmosphere feels dusty and choking. Several persons complained: one girl said that by the time she reached home in the evening, she had no appetite and ascribed it to the dusty air. The employees also stated that the air is worst in the summer time, when it blows down in hot and dusty currents. They stated that the employees in this department are constantly changing, although the wages are said to be higher in this office than in others."

Besides the salesgirls and a few women employed for clerical work or as sheet writers in the shipping departments, a large percentage of women working below the level of the main floor are the cashiers or tube girls in the pneumatic tube rooms. The work of these girls is thus vividly described by an inspector:

"The normal number of employees in the tube room at X's is about 45, although around Christmas it rises to as many as 65. The work can be done both in a sitting and standing position, and the girls may suit their convenience in this respect. But the constant noise of the arriving carriers, the hissing of the air current when the carriers are sent back, the artificial light, and the rapidity and strain of the work, especially during the lunch hour or towards evening when the rush is greatest,—all this makes the position of tube cashier not an enviable one. The girls are locked in behind a cage door, and the many tubes coming down to this room give it the appearance of a strong metallic cage, which employees call the "Dungeon."

Not only are these cashiers compelled to breathe the stuffy basement air, but in many pneumatic tube rooms they complained about the dust which seems to be brought into the room through the tubes themselves. In one store where the tubes end exactly on a level with their mouths, the girls asserted that they inhale so much dust during the day that they taste the dust when eating supper. In a second store the inspector talked with the ten girls employed in the department and *every one* complained of dust. Two girls had catarrh quite badly. In still another store where fifteen girls were interviewed, practically everyone objected to the dust in the tubes. The dust was particularly marked in the morning and in tubes which had not been used for some time.

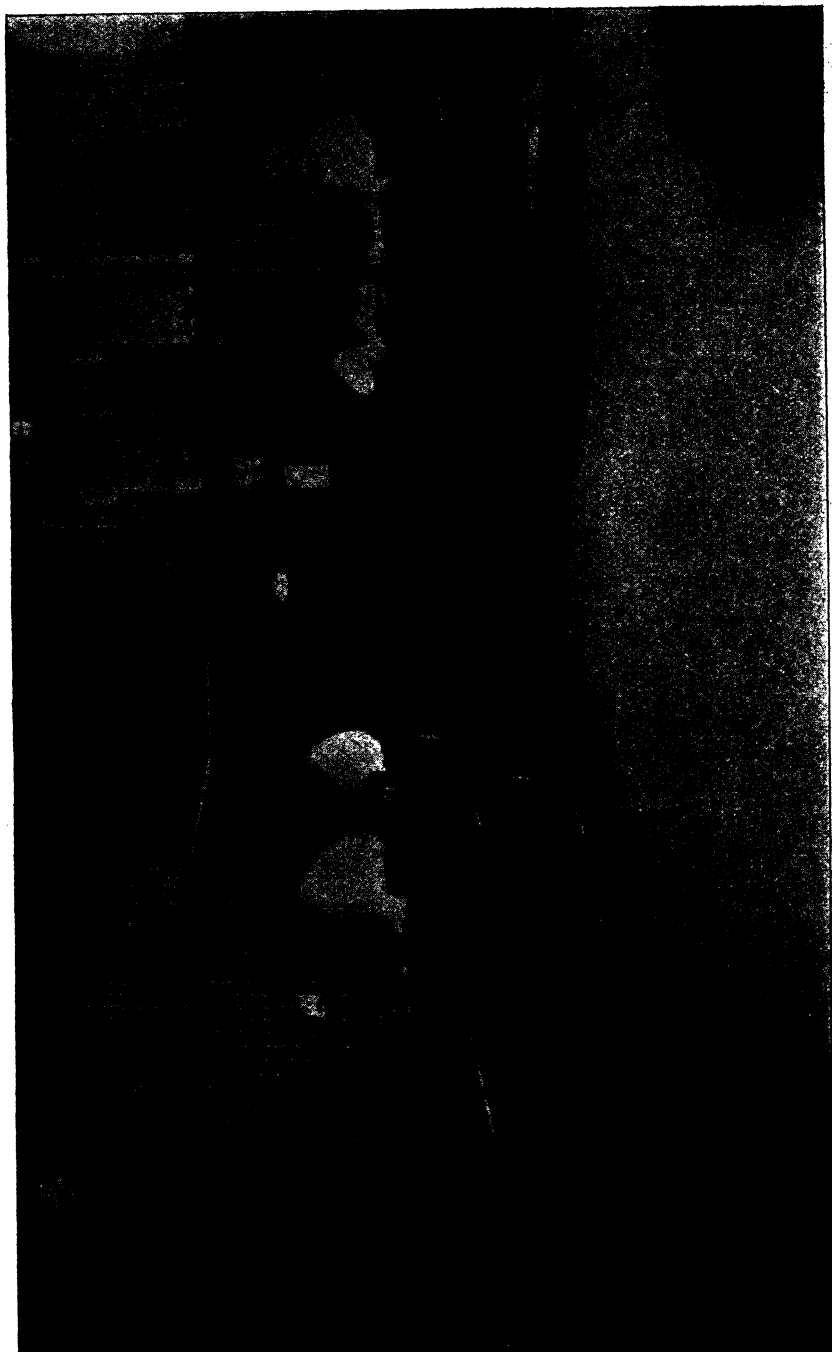
The opinion is, however, that the dust can be partly, if not wholly, removed, provided the store is cleaned thoroughly with a vacuum cleaner at night and the current of air is allowed to run through tubes for fifteen or twenty minutes before the girls begin work in the morning. In contrast with those described above, we saw far more satisfactory pneumatic tube rooms in other large establishments located above street level, well lighted and well ventilated. They are equipped with tubes which did not end opposite the mouths of the employees, but which reached down to the waist of each girl. In such tube rooms the employees had no complaints and looked generally healthier.

In the course of this inquiry it was not possible to determine the impurities of the air by means of exact scientific tests. This would have required the assistance of ventilating experts. Such obvious defects as have been described are matters that can be observed by a general investigator.

In conclusion, it may be said again that the failure to provide adequate ventilation is the most serious sanitary problem which thus far the employers have failed to solve. Failures in ventilation, such as overheated or drafty rooms or stuffy air, cannot be ignored from the standpoint of the workers. It has a direct bearing on general health and therefore on the alertness and responsiveness of the employees.

5. *The Nervous Tension.*

Apart from these evils there is no doubt that department store employees are subjected to serious nervous strain. The



A TUBE ROOM ABOVE STREET LEVEL.



saleswomen are not "speeded" by machinery to be sure, but there is a compulsion to work at high pressure in order to keep up sales. Various different devices to promote sales are in use. Their common aim is to stimulate the saleswomen to increase their receipts. The girls know that not only their advancement, but their position and wage are determined entirely by sales. They must work with rapidity and accuracy. They must be apt in memorizing prices, faces, and particular sales. When there is a string of impatient customers, they are obliged to wait patiently and pleasantly on one person while three or four may be insistently demanding attention at the same time. All this is a necessary part of the occupation. But it must be recognized that the saleswoman performs harder and more responsible work than at first sight is evident, and that her attention and application may easily be overtaxed.

The saleswoman is required not only to handle goods, but also to do accurate clerical work at each purchase and to handle money whenever cash sales are made. Moreover, different methods of procedure may be required for successive purchases. The ordinary "pay and take" purchases are interspersed with C. O. D. sales, entered on a separate C. O. D. slip; deposit account sales; transfer sales, and many other varieties. While the process of making out these different sales slips becomes more or less a matter of habit, yet an overtired girl, besieged by customers, is very liable to make mistakes. The new girl, too, often finds herself in a quandary as to how to record a complete sale. She has probably been to the store school a few mornings, but she soon discovers that the paper proceedings transacted there are very different from the practical business behind the counter. Printed directions are said to be provided in some stores, but our working investigators never received them and there is little evidence that the practice of distributing such leaflets is followed even in large stores. The salesgirls who work beside a new clerk are indeed remarkably kind and considerate, but, especially at the very busy season, she hesitates to trouble them with her questions and perplexities. The floorwalker is, of course, the person to whom a girl should turn in such a difficulty, but in doing this she is aware that she will often invite reproof rather than advice and information. Consequently the untrained girl flounders helplessly about

until she multiplies her mistakes and receives the blame for serious blunders.

In case of errors, no matter what the rush of work or the lack of experience, the loss is usually deducted from the salesgirl's earnings. She must be constantly alert to avoid such "dockings."

In many cases, moreover, the mistake for which a girl is blamed may be the result of another person's carelessness. For instance, a fine is inflicted by certain stores for the loss of a duplicate sales-slip or "stub." Generally speaking, as soon as the girl at the counter has sold an article she enters in her salesbook the name and amount of the purchase, together with amount of money received. A carbon sheet is used to make a double entry. After the sale has been transacted the clerk must record it in the back of the salesbook and must also fasten therein a portion of the carbon duplicate. If any such duplicate is missing at the end of the day, a fine of 5 or 10 cents is incurred. This sometimes happens when one girl, beset by several customers, snatches the book of another girl. If she keeps the slip, the other girl will be minus a slip at the end of the day, and, though not altogether to blame, must bear the penalty. In regard to this deduction the following is quoted from the proceedings of the Commission at the hearing on mercantile establishments:

"Q. What do they fine you for, besides being late and getting wrong addresses?

A. If there are any wrong checks, or if there are any checks missing, any stubs, at the end of the day. We have to turn in a certain amount and if they are not all there, five cents for each."

Another fine which is keenly resented by the girls is the fine for wrong address. Whereas, in a number of cases, it may be the fault of the salesgirl for writing illegibly or for carelessness, it is just as often the fault of the customer for speaking indistinctly or for being unacquainted with the correct address. This was strikingly brought out by one of the girls who testified before the Commission:

"Q. What other fines are there?

A. In case of a wrong address you are fined twenty-five cents.

Q. In case you give a wrong address?

A. In case *you* give a wrong address, we are fined twenty-five cents."

While many girls take the fine for tardiness philosophically, practically all complain about the fine for incorrect address. Girl after girl said to the inspectors, "It wasn't my fault at all, but with the house it makes no difference." One girl told of being fined twenty-five cents because the customer gave a former address in stead of her present one. Even when the mistake was explained the fine was not remitted. In a few stores the clerks are even charged the expense of sending the purchase to the wrong address. One store, in particular, has a large notice posted in the passageway to the cloak room, reading: "All clerks causing wrong addresses will be charged cost of delivery."

Many stores, on the other hand, have discontinued fining for a wrong address and have substituted some other way of dealing with this matter which is far more effective. In one store, for example, the girls were formerly fined twenty-five cents for every wrong address, and the kind of error they made was not explained to them. Recently an experiment was tried whereby fines were imposed only for repeated offenses. But all girls who had written wrong addresses were sent to the superintendent's office where their errors were shown them and where, if necessary, they were reprimanded. It was found as a result that the percentage of wrong addresses had appreciably diminished.

In another store the employees are occasionally summoned to a lecture in the assembly room, and there the incorrect salesslip on which the employee's number appears is flashed on a screen. Wherever it is clearly a case of misspelling or slovenly handwriting, the clerk who committed the error is so mortified that the lesson is taught without a word spoken.

Most of the higher class stores told the investigators that they would rather dismiss a girl altogether than be constantly fining her for mistakes. Such penalties, they say, only rouse the antagonism and ill will of the girls without correcting their carelessness. The various methods above described of instructing instead of disciplining a careless employee have proved far more effective than any fining system.

In the case of "short change" or other discrepancy in regard to payments, no uniform policy is followed. In some stores, after an unsuccessful attempt has been made to locate the mistake, the salesgirl alone is held responsible; in other stores the tube cashier, in every instance, is obliged to stand the loss. A few stores have a board of arbitration which settle questions of this sort, and which sometimes decide that the shortage should be divided between clerk and cashier.

Oftentimes, especially during the holiday rush, the losses sustained by these girls are considerable. Our inspector visited one store on December 29th and talked with five tube cashiers who had made errors during the fortnight before Christmas. One girl had been "short" 50 cents, another \$1.00; one had taken in a counterfeit five dollar (\$5) bill; one had a discrepancy of \$19, and one had made two mistakes of \$6.68 and \$7.56, respectively. All the girls told the inspector that they were held wholly responsible for these errors and that the amounts would be deducted from their wages. The last mentioned girl earned \$6.00 a week and when the inspector remarked that she seemed to have lost more than she made, she replied that she was going to leave just as soon as she had paid up for her mistakes. All these girls complained of overwork during the fortnight and agreed that it was "easy to make mistakes."

In certain other stores girls reported losses which they "supposed" would be deducted from their pay envelopes, although in some cases they added that the store might not be so strict at Christmas time. This indefiniteness, however, is almost as discouraging and demoralizing as would be the deduction of an amount of money. Not only does it keep the girls whining and complaining about the management, but it also keeps them quite ignorant of the amount of money they will have for expenses the following week. In some cases they receive a full pay envelope when they expected a deduction, in other cases they find 25 or 30 cents deducted when they had no idea that they had made errors. Testimony given before the Commission shows how uncertain a girl is as regards the contents of her pay envelope:

"Q. How much were you fined?

A. I was fined twenty-five cents and, of course, I never knew it.

Q. Who does the fining?

A. I don't know, sir.

Q. Do you know when you are fined? Do they tell you?

A. No, we have to find out; there is just simply money missing out of your salary.

Q. They do not send you a paper or slip of any kind?

A. No.

Q. Do they hand you a slip?

A. No, we have to find out."

Another set of employees equally responsible in handling money are the little floor cashiers and parcel wrappers. These children (for in most stores they are practically all between 14 and 17 years of age) are paid the lowest wages and yet are expected to fill positions demanding accuracy, responsibility and untiring alertness. In stores where a supplemental system of cash registers is not installed, these girls are the pivots on which the activity of each department turns.

It is worth while to describe in detail the part which these cashiers and parcel wrappers play in an ordinary "pay and take" purchase. We have seen how the salesgirl enters in her book a record of each purchase, using the carbon sheet to ensure a double entry. The next step in the transaction is to place the goods purchased and the half of saleslip containing the original entry on the ledge beside the cashier's "coop" and to fold the carbon copy and the money received into an empty pneumatic carrier. The floor cashier takes the carrier from the salesgirl, rams it down the mouth of the tube and then awaits its return from the pneumatic tube vaults where the transaction is recorded and the saleslip returned through the tube along with any change. Meanwhile the little packer or inspector, who stands near the cashier, inspects the price mark attached to the goods sold to see whether this figure corresponds with the value marked down on the duplicate saleslip,—a detail which must be carefully attended to before the article can be wrapped and tied up. Finally, when the carrier shoots from the tube, the cashier opens it, compares the change received with amounts recorded in the saleslip, matches the carrier with its correct bundle, and delivers carrier and goods into the hands of the proper salesgirl.

Such is the division of labor between cashier, packer and salesgirl in the big department stores. But whereas there are five or six salesgirls to a counter, in many stores there is only one cashier and only one packer. When the salesgirl leaves for her luncheon hour or takes 15 minutes "off the floor" her share of work is distributed among her companions behind the counter. Each worker bears a part of the responsibility during her absence. But when the cashier goes away at noon, a double burden falls upon the packer. She must not only tend the carriers and count the change, but inspect and wrap the goods as well. Or if the little packer leaves the floor, the cashier is expected to shoulder all this work in addition to her own. The moment the cashier or packer deserts her post, the pressure of work becomes well nigh intolerable for whichever one remains. During Christmas week one tired packer complained to an investigator that "she was just dead with all the rush." When the investigator inquired if she had any time to rest during the afternoon, she replied that she was supposed to get fifteen minutes "off the floor," but every time she started away the salesgirls kept piling up work so that she "never got a chance."

It is during the holiday season, of course, that the strain is most continuous. Oftentimes the management augments the selling force of the store by half its regular staff and only increases the number of packers and cashiers where it is judged absolutely necessary. In this way the goods are sold quickly, although customers are puzzled and irritated at the way in which they are kept waiting for their change fifteen or twenty minutes. In one large store two young girls (one 15 years and one 17 years old) served fourteen salesgirls who in turn were waiting on several hundreds of customers. These children worked at breakneck speed; they were in their places up till the last minute before closing time, and since no special seats were provided for them they were obliged to stand all day long. The younger girl, Anna, aged 15 years, was almost crying of weariness. Not only did she complain that her "legs ached awful," but that her hands smarted "from doing up so many boxes and tying so much string." "They think they've got a horse here," she said to the investigator.

It was worst of all at noontime when the crowd was at its thickest and when Mary, the cashier, was out at luncheon, leaving Anna to cope singlehanded with the hordes of shoppers. It would be almost impossible for a person with many years' experience to remain calm and unruffled, while a score of salesgirls pressed around the desk impatiently calling their numbers, heaping up unwrapped goods, or begging to see if such and such a carrier "ain't up yet."

In such press of work mistakes are unavoidable. In this particular store the cashier or packer is given ten cents for detecting any error made by a salesgirl, who thereby loses ten cents. Occasionally, however, both cashier and salesgirl suffer on account of mistakes. One afternoon about 4 P. M., when the high tide of customers had not appreciably diminished, and when the little cashier Anna was almost worn out, two salesgirls rushed up demanding their change "at once." One salesgirl was to receive a bundle and a saleslip, but no change. The other was to receive a bundle and also 27 cents in change. Anna, bewildered by the chorus around her, handed to salesgirl No. 1 the carrier containing the 27 cents which belonged to salesgirl No. 2. The first salesgirl, surrounded by half a dozen customers, did not look to see if 27 corresponded with the amount written on the saleslip, and so allowed the woman to walk away with the change. Meanwhile the second salesgirl, discovering that she was 27 cents short, called the floorwalker. He declared that salesgirl No. 1 would be fined 27 cents for carelessness in not counting her change and also that Anna would be fined 27 cents for carelessness in mixing up the carriers.

Since the management was not as strict as usual in inflicting fines at Christmas time, it was impossible to ascertain whether this threat was actually carried out. But whether or not any fine was eventually imposed, the damage was done. Anna who was paid \$4.00 a week was upset and unnerved to the point of tears at the thought of losing 27 cents on Christmas week. The salesgirl was sullen and discouraged. The other girls at the counter murmured against the store and thought it a shame to treat employees in this way. As a result, the department was demoralized in the middle of a busy afternoon. The firm showed

its poor management by overworking the cashier and then threatening to fine both employees at a moment when they were least able to bear reproof. Co-operation and good spirit were destroyed to the serious detriment of the efficiency of the whole department.

It is essentially a matter of good management that no class of employees should be overtaxed. In some stores, accordingly, girls who are older and more experienced are employed as floor cashiers. In other stores the number of salesgirls to packer and cashier is not so disproportionate. In a number of the best stores boys and young men were found engaged in this work.

It is obviously impossible to conduct a huge establishment wherein thousands of people are employed without enforcing some form of discipline to train them in exactness and efficiency. The question is, whether this discipline should best take the form of fining for every sort of error and neglect of duty or whether, as in some stores, the incompetent may not be weeded out by dismissal, and the competent, who remain, be so instructed that they will to a great extent avoid making careless mistakes.

VI. HOURS OF WORK.

The duration of the day's work is an essential part of this inquiry. Whatever hardships exist are intensified by the long hours of the employment. The injury caused by standing, for instance, is more than proportionately increased by overtime frequently prolonged several extra hours beyond the ordinary working day.

In the discussion of hours which follows, no extreme or exaggerated instances are quoted. Nor have isolated cases been selected for special mention. We shall discuss the regular hours of work and also overtime.

1. *Regular Hours of Work.*

The hours of labor of 38,385 women have been compiled and are given in the following table. The regular weekly hours were ascertained from employers, but the extra time required at Christmas and other occasional overtime is not included in this tabulation.

TABLE No. 6.
WOMEN'S REGULAR HOURS OF WORK IN 216 STORES
(EXCLUDING OVERTIME).

| NUMBER WOMEN
EMPLOYED IN: | 50 and
less than
54. | 54 and
less than
57. | 57 to 60
inclusive. | Over 60. | Total. |
|------------------------------|----------------------------|----------------------------|------------------------|----------|--------|
| New York City: | | | | | |
| Department stores..... | 13,437 | 13,972 | 1,621 | 37 | 29,667 |
| 5 and 10 cent stores..... | 124 | 520 | 298 | 38 | 980 |
| Up-State: | | | | | |
| Department stores..... | 2,991 | 2,317 | 2,236 | 39 | 7,583 |
| 5 and 10 cent stores..... | | 178 | 577 | | 755 |
| Total..... | 16,552 | 16,987 | 4,732 | 114 | 38,385 |
| Per cent..... | 43.1 | 44.3 | 12.3 | .3 | 100 |

We note that the hours here given are not excessively long; 87.4 per cent of the women are reported as ordinarily working less than fifty-seven hours a week. We shall later see how these hours are lengthened by delays within the stores, which are not taken into consideration in the reports of employers.

In order to discuss the hours of labor in detail, we may roughly classify the stores investigated under three headings:

1. Those closing every day at 6 P. M.
2. Those closing every day except Saturday at 6 P. M.
3. Those closing later than 6 P. M. two or more days a week.

TABLE No. 7.
NUMBER OF WOMEN EMPLOYED IN 216 STORES ACCORDING TO CLOSING HOURS.

| CLOSING HOUR. | Number
stores. | Total number
of women
employed. | Per cent. |
|--------------------------------------|-------------------|---------------------------------------|-----------|
| 1. 6 P. M. daily..... | 35 | 27,212 | 70.9 |
| 2. 6 P. M. except Saturday..... | 100 | 9,577 | 24.9 |
| 3. After 6 P. M. 2 or more days..... | 81 | 1,596 | 4.2 |
| Total..... | 216 | 38,385 | 100.0 |

Of the 216 establishments investigated only thirty-five closed throughout the year at 6 P. M. or shortly thereafter. Yet these stores employed 70.9 per cent of all the women considered in our inquiry. They are, in fact, the chief department stores of New York City.

Into the second class fall a majority of the Up-State department stores, about half the five and ten-cent stores and a number of

minor New York City establishments which correspond in size to most Up-State stores. About 25 per cent of the women worked in stores of this class which kept open on Saturday evenings.

The third class of stores under consideration comprises the remaining five and ten cent stores and the larger neighborhood stores which were within the scope of our survey. Fifty-four of these stores were open to the public two nights a week and twenty-seven were open three nights a week. The hours of labor in these eighty-one stores are by far the longest and the girls are sometimes compelled to remain at their posts on Saturday till after 11 o'clock at night. We have, however, considered this class of store in less detail, since it includes but 4 per cent of all the female workers. Moreover, it is questionable whether the work in a large store where the "system" is strict and where the girl is in hourly contact with multitudes of people is not as fatiguing as employment in a small store where hours are longer.

In the 181 stores that are open on Saturday nights, women were dismissed at the following hours:

TABLE No. 8.

NUMBER OF WOMEN WORKING IN 181 STORES WHICH ARE OPEN AFTER 6 P. M.
SATURDAY NIGHTS.

| SATURDAY CLOSING HOURS BETWEEN: | Total number
of women. | Per cent. |
|---------------------------------|---------------------------|-----------|
| 9 and 10 P. M..... | 2,726 | 24.4 |
| 10 and 11 P. M..... | 8,318 | 74.4 |
| After 11 P. M..... | 129 | 1.2 |
| Total..... | 11,173* | 100.0 |

* Adding 27,212 women who stop work at 6 P. M. brings the total up to 38,385.

Included in this table are stores of both class 2 and 3. They are open either Saturday only or two or more nights in the week. According to the custom of most neighborhoods, the Saturday closing hour is always latest. Of the 11,173 women who are employed, 24.4 per cent were released between 9 and 10 P. M., while 75 per cent remained even later. Obviously this late closing hour results in the longest weekly hours.

2. *How the Hours of Work are Lengthened.*

The employees' usual hours of work are lengthened in various ways beyond the time when the stores are open to the public. The

employees' workday does not correspond with the time allowed for shoppers. If the public is admitted at 8:30 A. M. the girls must be in their places ten or fifteen minutes before.

In most stores the time is taken twice: once by the time keeper at the entrance, whom the girls must pass before 8:15, and once by the aisle manager of their department, whom they must reach before 8:20. Tardiness at the entrance is usually punishable by fine, tardiness in the department, sometimes by fine, but more often by a sharp reprimand,—in certain stores the offender must even go to the office and obtain a pass before she is allowed to enter her counter. The policies of different stores vary widely in regard to their fining system. Many are uncompromising and impose severe fines for lateness; others are more lenient and exact a smaller fine which may be graded according to cumulative tardiness (20 minutes or more allowed during the week). In the majority of the stores where a fining system is enforced ten to fifteen cents is deducted for tardiness up till 9 o'clock, after which the girls lose a pro rata sum for their absence. In a few shops where the manager asserted that no such penalty was ever imposed, it was afterwards learned from the girls that they were not "fined," but that they were sent home if late and a half day's pay forfeited. A few shops have discarded the fine for lateness altogether and believe that better results are obtained by discharging girls who are habitually unpunctual.

There may of course be unavoidable delays on the way to the store. Once arrived, there are the usual difficulties where everyone is trying at the same time to "ring in," to push into the elevator, or to get into the dressing room and up to her floor. It is little wonder, therefore, that the prudent employee arranges to reach the store ten to fifteen minutes early, although in so doing she lengthens her day's labor by just so much extra time.

At noon, again, the time allotted for luncheon is apt to be cut down. Work in a store is, of course, continuous, and the employees must be released in shifts for their luncheon periods. It is, therefore, impossible to post uniform hours of stopping and beginning work at noontime. In the large stores employees are allowed to leave their work for three-quarters of an hour in relays during the period from 11 A. M. to 2:30 or 3 P. M., but oftentimes there is so much carelessness in the procedure of let-

ting saleswomen off the floor that part of this short recess is wasted. Wherever it is the business of the aisle manager to give permission to leave, several minutes may be lost while hunting for him through the departments.

In some shops there may be a line waiting at the time clocks or at the elevators to cause delay, or in the lunch room itself, particularly during the busy season; the girls may have to wait their turn to be served. One investigator thus explains how the interval for quiet and refreshment is cut down:

“Recess for lunch is three-quarters of an hour, and my time for leaving is 12:30. In case I have delayed to get a pass from the floorwalker, my number is also punched at the entrance door. Much time is lost waiting in line. Fifteen or twenty minutes is as much time as I have been able to take for luncheon any day.”

It is essential that the employees should receive the benefit of the whole period of 45 minutes allotted them, in order that they may return to their places rested and ready to work.

It is particularly at night, however, that the hours of the saleswomen stretch out beyond the closing hour. In the large stores the first bell which rings at 6 o'clock is meant for customers only. If a shopper is not disposed to hurry and lingers over a counter, it is the duty of the salesgirl to comply with her requests. As one girl said “to demonstrate goods just as if it were 9 o'clock in the morning.” At the second gong, 6:05, stock is packed away, displays are taken down, goods are covered, curtains put up and a certain number of girls allowed to leave. At the third gong, 6:10, the majority of employees are dismissed. Two or three monitors are usually retained at each counter until the fourth bell sounds at 6:15, when the floors are cleared. Although in every shop it is so arranged that girls take turns in waiting until the last signal, only two firms were reported in which the first bell rang at 5:45 or 5:50, and practically every girl was ready to go home by 6 o'clock.* In the stores, where the girls do not leave their departments until 6:10 or 6:15, it is seldom that employees actually reach the street before half past 6 o'clock.

*Another store makes a similar arrangement to shorten the day's work by allowing girls to reach business at a later hour on alternate mornings.

One inspector thus describes this exodus of employees from a big department store at night:

“The first bell rang at 6 o'clock. The clerks began to cover up the goods. At 6:05 the second bell rang and brought a rush of employees towards the locker rooms. For fully 15 minutes until 6:20 the employees were getting their clothes out of the lockers. Many did not stop to put on their coats but carried them out of the locker-room. The large numbers of employees crowding in for their clothes made it necessary for many to remain and wait until the earlier comers had left, and thus some did not leave the store until 6:25 P. M. Also a number of cash girls or messengers are obliged to take turns every week to collect the salesbooks, and to carry them to the office on the fourth floor. They are among the latest to leave the building.”

In such ways, then, the 57-hour week is lengthened by 10 minutes here and 15 minutes there until even in the ordinary routine it nearly approaches 60 hours.

3. *Overtime.*

Furthermore, in the absence of restrictive laws regulating the hours of women's labor in stores, the ordinary day may be indefinitely lengthened. Girls under the age of 21 are not permitted by the mercantile law to work more than 60 hours a week. But a woman has only to attain the age of 21 years and she can be called upon to work hours that are unlimited by law, either by the day or by the week. Moreover, neither girls nor women are assured of a weekly day of rest. They may spend all day Sunday in the store without violation of the labor law.

Finally, since the mercantile law does not require documentary evidence to show that a woman is over 21 years of age, younger girls are often called on for work beyond 60 hours. It is a fact that not a single store reported keeping a special register for girls under 21 years of age. A few told inspectors that in case of overtime work they “tried” to distinguish between those who had and those who had not attained their majority. Consequently a girl (unless she is obviously too young) may be kept for work beyond the legal hours. That certain merchants evade the

60-hour law is proved not only by the reports from inspectors and inside investigators, but also by the testimony of girls subpoenaed before the Commission. Moreover, protection of the law is entirely removed from December 18th to 25th. There is then no legal limit to the working day except for children under 16 years.

To quote the handbook of "useful information" issued by one of the prominent department stores, "Business hours are from 8:20 A. M. (when all employees must be at their respective stations) to 6 P. M. and *such additional time as may be required on special occasions.*" Since the routine of department stores so often requires this additional time, no study of mercantile pursuits is complete without a detailed discussion of overtime, namely, to what extent and when it takes place, for what special purposes it is used and what hardship it entails.

The subject may perhaps be presented more clearly if a distinction is drawn between two kinds of overtime: (1) When the store is closed and employees are obliged to work behind locked doors, either at night or on Sunday; and (2) when the store remains open past the customary closing hour and employees are expected to stay until the customers leave, whatever the hour may be. Often, however, the girls who are kept to wait on customers in the evening hours may also be detained for further work after customers have departed.

a. *Overtime When Store is Closed.*

On many different occasions both in the sales and office departments the women are kept after the store closes; the saleswomen to take stock, to rearrange or move departments, or to prepare for special sales; the audit girls and bookkeepers to make up accounts. As one witness declared, "All through the season there is more or less overtime in some form or other."

On the first of every month and sometimes oftener it is well nigh universal for girls in the offices to remain at their posts until late at night. The following testimony of an employee in an audit department is typical:

"Q. Do you have to work overtime now?

A. Why, certainly, the first of the month we do . . .

Q. That is the first of every month?

A. Yes, the first of every month we work."

In addition reports from various inspectors show how managers take it for granted that employees in these departments should stay at stated times beyond the 6 o'clock closing hour. For example, one inspector writes:

"At 6:30 I reached the fourth floor. In the office there were five young women, all of whom looked over 21 years, working overtime. Their regular hours of work are from 8:30 until 6 P. M., but once a week and sometimes twice they remain in the office until 8:30 or 9 o'clock. They are served a supper and receive 20 cents an hour for such service. On the same floor in the cashier's offices there are seven young women at work. They also remain until 9 or 9:30 P. M. five times every month, the days immediately before and after pay days."

Less regular but equally long overtime often occurs in the sales department, whenever there is rearrangement, itemizing or replenishing of stock for special sales, and whenever departments are moved. In one instance employees were detained in a large store on Saturday night until 10:30 o'clock and on the next day, Sunday, from 9 A. M. to 5 P. M. in order to move the drug department to the counters occupied by the stationery department, and *vice versa*. Similar instances were also found in the records of a hearing before the Commission, as follows:

"Q. Do you have overtime there?

A. At Z's, yes.

Q. Much of the time?

A. Yes, in a way; that is, we will never know when we are called to work. I am in the china department, and every once in a while Mr. A. takes a notion to change the department, and, of course, we would not know until about ten minutes to 6. Last week I stayed one night only until 7 o'clock, because I asked the buyer if he could spare me. I wanted to be home at half past 7, but the rest of the girls stayed until ten minutes of 8.

Q. Don't they have a porter to do the moving around?

A. No; I heard that this last move they asked men from the delivery department to come up and help us, but they

refused to work overtime for \$1.50 a day, so we had to do the work, and we didn't get paid for it at all.

Q. This overtime was simply due to the fact that they wanted to make some change in the department?

A. Yes."

And again in the minutes of the hearing this testimony occurs:

"Q. How long did you work overtime, how many hours?

A. Until 11 o'clock some nights, some nights half past 10. We had to move tables, regular porter's work, moving boxes and moving stocks around. I lost my health at X's.

Q. What months did you have to work this overtime in?

A. From October to November and December, not saying what nights you could call your own."

Thus it is clear that the hours of labor are not only long but also exceedingly irregular. The girls may be called upon to stay any night without previous warning. Sometimes, as further testimony reveals, they are not notified until late in the afternoon that they are expected to work that night.

"Q. When you have to work overtime do they give you any notice in advance, or do they notify you at any time during the day?

A. On Saturday we did not know until half past 5 that we were going to stay.

* * * * *

A. The boss would tell you you should not make any plans about going out and that you should tell the people at home that if you are not at home at a certain hour not to expect you."

The irregularity and failure to receive advance notice, especially when overtime is for the arrangement of stock and therefore easily anticipated, are as distinct a grievance among the girls as the long hours themselves. Engagements must be cancelled, supper must wait, anticipations of a quiet evening fade before an unexpected summons to remain at the store for the evening or to report for business on Sunday. .

b. *Preparation for Christmas.*

Whereas, as we have pointed out, overtime may occur during any season of the year, the greatest rush of work comes before Christmas in November and December. The girls are then employed to unpack and arrange new goods in anticipation of the holiday crowds. They open boxes, tag and inventory articles, clean and assort stock. Such preparing and replenishing are necessary in many departments of a large store, especially at the handkerchief, toy, candy, silverware and book counters, where goods are most quickly sold. The office clerks are also kept to straighten accounts and to check up increased sales. One significant case described at the hearing before the Commission was that of a girl employed in the auditing department of a large store. This young woman worked from September 23d until November 30th, a period of nine weeks, three times a week from 8 A. M. until 7:30 P. M., one hour for lunch, no time for supper, making a total of $10\frac{1}{2}$ hours a day or $58\frac{1}{2}$ hours a week. From December 1st until January 31st (eight weeks), from 8 A. M. until 10 P. M., one hour for lunch, one hour for supper, making a total of 12 hours a day or 63 hours a week. This girl received a salary of \$6.50 a week and was not paid extra for this extra work. At this season of the year such consecutive overtime is not unusual.

We also have evidence from both inspectors and store employees that throughout these two months girls worked ten or more hours a week beyond their regular schedule. E. L., being duly sworn, said:

“The first week of November I worked every night until 10 and 11 o'clock, also I worked on Sundays. I worked all day Thanksgiving Day, working from 9 A. M. to 5:45 P. M.”

Further testimony given at the Commission's hearing bears directly on this point, for example:

“Q. Will you state again how many hours you worked a week when you worked this overtime, how many days in a week you worked overtime?”

A. Every other night overtime. Why, it would be 7 P. M., 7:30 P. M., when you get out, and that was early without supper.”

Nor are such assertions merely the exaggerated statements of overwrought employees. Our inspectors brought back similar reports from many establishments. In one popular store overtime in certain departments began about Thanksgiving. An inspector visited the store repeatedly to make observations and interview the girls working at night. In the sporting and toy departments five girls (one was 19 years old) worked the week beginning November 24th two nights until 10 P. M. and on Sunday from 9 A. M. to 5 P. M. The two following weeks the girls at these counters worked three nights until 10 P. M., on Saturday, December 14th, until 10:30, and again on Sunday from 9 A. M. to 5 P. M. Beginning December 15th they were at their places until 10 P. M. for the first three days of the week. Thereafter came the still longer hours of Christmas overtime, when the store was open evenings.

c. *Hours in the Exempt Period (December 18th to 24th).*

The mercantile law becomes inoperative for the six days preceding Christmas, and consequently stores may keep open long past their usual hours, the time of closing in many being fixed solely by the volume of the crowd. Since in most stores the women are expected to remain on duty the entire time the store is open, and sometimes even after the doors are closed, it is important to determine their hours of labor as exactly as possible.

In the course of this inquiry the amount of overtime required at Christmas could be ascertained in only sixty-six department and twenty-eight five and ten-cent stores. These are all located in New York City. In the department stores the employees worked the following hours during the six days preceding Christmas (December 18th to 24th, excluding Sunday):

In 16 stores doors closed at 6 P. M. or a double shift was employed.

In 3 stores the hours were from 60 to 65.

In 5 stores the hours were from 65 to 70.

In 4 stores the hours were from 70 to 75.

In 20 stores the hours were from 75 to 80.

In 18 stores the hours were from 80 to 85.

For five and ten-cent stores the hours were even longer during this period:

In 3 stores there was no overtime.

In 1 store the hours were from 65 to 70.

In 12 stores the hours were from 75 to 80.

In 12 stores the hours were from 85 to 90.

The time off for luncheon and for supper has been deducted. It must again be emphasized that this is not a record of total overtime hours during this interval before Christmas, but only of hours worked while the store was open to the public. In certain departments girls remained after customers had departed from the store. In the sixteen department stores which closed at 6 P. M. it does not mean necessarily that the girls were dismissed at 6 P. M. Moreover, in practically every big store testimony from inside investigators, inspectors and employees proves that saleswomen worked at certain counters from five to eight hours on Sunday, December 22d. Therefore, any estimate of Christmas overtime, as given above, is bound to be inexact and to fall below the actual hours of work.

The various stores differ widely in regard to their closing hours during this period. Stores which cater to a high class of trade generally adhere to their 6 P. M. closing. A few stores remain open only for an hour later. Others have a strict 10 o'clock rule throughout the entire six days. Some shut the doors at 7 o'clock the first three days and at 10 o'clock the last three days. Certain establishments are credited with closing at 10 o'clock sharp, when in reality they were open so long as the crowd made business profitable. In one store the girls told the inspector that they were "supposed to close at 9:30, but it gets a little later every night." Another manager assured the inspector that the hour for dismissal would be on the stroke of 10. But the inspector remained upon the premises and found that it was 11 o'clock before the girls left the store on December 23d.

In the smaller neighborhood stores hours were especially excessive because there was no fixed closing hour, and girls were detained behind their counters until every shopper had left the

store. In one part of the city where a number of these stores are located the inspector's report of one store is approximately true of all.

December 18th and December 19th, 9:30 A. M. to 10 P. M.

December 20th, 9:30 A. M. to 10 P. M.

December 21st, 9:30 A. M. to 11:30 P. M.

December 23d, 9:30 A. M. to 10:30 P. M.

December 24th, 9:30 A. M. to 11:30 P. M.

It will be noticed that although morning hours are comparatively short, the closing hour is set by the trade of the store.

Many employers asserted that the employees who remain for evening work are allowed as much time off on the following day or week. Our inspectors and investigators confirmed this statement concerning some stores, as indicated above in one case.

On the other hand, the investigation did not show this to be a universal practice. In one store the superintendent assured the inspector that the girls who worked at night returned late the next morning. But a girl under 21 years employed in this store who stayed overtime one evening without supper or payment, declared that she was fined for being a few minutes late the following day. Again an inside investigator reported: "Mrs. M. has been on night duty and has to report at the same time in the morning." And once more quoting an inspector in another store, "Girls have to be in promptly at 8:05 on Monday morning" (after Sunday work). Our own observations lead us to believe that in the Christmas season the employees are generally required to begin work as soon as the store opens.

4. *Detailed Study of Overtime in Two Stores.*

Perhaps the most convincing proof of the duration of overtime work is the intensive study of hours undertaken for certain classes of workers in two large stores. This information was secured from the records of the stores. It reveals two facts of importance, first, the difficulty of obtaining this information owing to the failure to keep adequate records, and, second, the exact amount of overtime required of individual women in a few selected departments of the store during November and December, 1912.

In the first store, the overtime hours could only be obtained from the daily overtime sheet which is made up and sent to the office every afternoon. It gives the names of all the employees who are required to stay overtime. They are entitled to supper, which the firm provides, but they must obtain supper passes from the time keeper. If the employees prefer to finish their work without stopping for supper, their names are not put on the daily overtime sheet, since they do not need to obtain supper passes. There is no record of their hours except that the watchman, in order to prevent unauthorized persons from entering the store, takes down their names as they leave the building. It was from this list that the hours of this particular set of supperless workers was ascertained. These girls are seldom informed as to the hours when they are to be dismissed. They understand that they must stay until the work is finished.

There were 197 women who worked overtime in the five departments whose records were compiled. During the period from November 6th to December 26th (42 working days), there was overtime on 32 evenings, including 6 Saturdays. On no two days and in no two departments were the hours of work exactly the same. As a rule, the permanent employees rather than the "Christmas specials" were expected to remain. The work was so distributed that the same women were not always employed.

The number of women who worked and their hours of leaving on these 32 evenings are shown below:

| DATE. | Number
workers. | NUMBER LEAVING. | | | |
|-------------|--------------------|-----------------|-----------|------------|-------------|
| | | 7-8 P. M. | 8-9 P. M. | 9-10 P. M. | 10-11 P. M. |
| November 6. | 11 | | 11 | | |
| " 7. | 9 | | 9 | | |
| " 11. | 10 | | 10 | | |
| " 12. | 14 | | 14 | | |
| " 13. | 6 | | 6 | | |
| " 16. | 10 | | 10 | | |
| " 18. | 16 | | 16 | | |
| " 19. | 5 | | 5 | | |
| " 23. | 12 | | 2 | 10 | |
| " 25. | 24 | | 24 | | |
| " 26. | 33 | | 28 | 5 | |
| " 27. | 7 | 7 | | | |
| " 29. | 21 | | 21 | | |
| December 2. | 11 | | 11 | | |
| " 3. | 29 | | 23 | 6 | |
| " 4. | 22 | | 22 | | |
| " 5. | 26 | 1 | 25 | | |
| " 7. | 10 | 2 | 1 | 7 | |
| " 9. | 11 | 1 | 10 | | |
| " 10. | 20 | | 15 | 5 | |
| " 11. | 30 | 1 | 12 | 7 | 10 |
| " 12. | 29 | | 8 | 15 | 6 |
| " 13. | 14 | | 12 | 6 | 2 |
| " 14. | 38 | | 9 | 23 | 6 |
| " 16. | 28 | | 10 | 4 | 14 |
| " 17. | 37 | 4 | 13 | 17 | 3 |
| " 18. | 50 | | 13 | 24 | 3 |
| " 19. | 41 | | 6 | 14 | 21 |
| " 20. | 37 | | 11 | 13 | 13 |
| " 21. | 34 | | | 31 | 3 |
| " 23. | 38 | | 16 | 4 | 18 |
| " 26. | 13 | | 13 | | |

More than one-half of the women stayed till 9 p. m. or later. More than one-fourth stayed till 10 p. m. or later. A small proportion was kept till 11 p. m. or later.

It will be noticed that 50 women constituted the maximum number employed any one evening (Dec. 18). In this last week before Christmas 88 women were kept overtime. Their individual records have been separately compiled and show that 16 worked 3 evenings, 15 worked 4 evenings and 10 worked 5 evenings. It is important to note that 48 of these 88 women were at their tasks successive evenings, for example, 21 were employed 2 consecutive evenings, 11 worked 2 consecutive evenings, 3 remained 4 consecutive evenings, 10 worked 5 evenings on a stretch.

Sunday work is given for each of the six Sundays, viz.:

| Dates. | No. Women. |
|---------------------|------------|
| Nov. 17th | 39 |
| Nov. 24th. | 14 |
| Dec. 1st | 7 |
| Dec. 8th | 10 |
| Dec. 15th | 54 |
| Dec. 22nd | 37 |

Although 54 was the maximum number employed on any one Sunday, 77 different women took turns in returning to the store for Sunday labor. Moreover, some of the 77 worked consecutive Sundays; thus 24 worked 2 Sundays or 14 days without break, 3 were employed 3 Sundays or 21 days without break, and 4 women worked 5 Sundays or 35 days on a stretch without a day's rest. Many of these 77 women worked evenings as well during this period so that they were late in returning to their homes and rest and leisure were seriously curtailed.

In the second store the overtime hours were obtained from the individual time cards which give the daily hours of arriving and leaving. The Christmas rush began later than in the first store. More overtime was concentrated into a shorter time because a larger force was kept at work. Overtime did not begin until December 2d, but during the weeks until December 27th, twenty-two working days, there was evening work on twenty-one days. In the five departments investigated a force of 425 women was employed for evening work, compared with 197 women employed in the five departments of the first store.

In the week preceding Christmas (December 16-21), when the rush was greatest, 273 women in four departments worked consecutive evenings as follows:

Week of December 16-21.

- 15 women working 2 consecutive evenings.
- 41 women working 3 consecutive evenings.
- 28 women working 4 consecutive evenings.
- 41 women working 5 consecutive evenings.
- 128 women working 6 consecutive evenings.

There was, however, comparatively little Sunday work in the second store. Only one department kept 32 of its employees busy on two Sundays before Christmas. It is the intensity of work from Sunday to Sunday that is especially striking.

The 51 packers, constituting 12 per cent of the total number of women who worked overtime, remained in the store on 16 different evenings, or every evening between December 5th and 23d. The latest hour of leaving for these employees was between 11 and 12 at night, but most of them worked until 10 p. m. Of these 51 women, 40 who worked on 15 different evenings, between December 6th and 23d, quit their work between 9 and 10; 28 women who worked on 14 evenings during the same period left the store between 10 and 11 p. m., and 14 who worked on 5 nights between December 11th and 23d left after 11 p. m.

The majority of the packers were young girls under 21 years of age. They stood at their work and had little opportunity to sit down. These girls were not required to report when the store opened in the morning, as there was no urgent call for their service until sales had accumulated for an hour or more. Except for the packers, however, there is no evidence to prove that other employees were allowed any leeway in returning to their tasks the next morning.

In this preliminary investigation it was not possible to obtain the exact hours of labor of all employees in even one large store. The above facts concern 622 girls and women employed respectively in five departments of two large stores. We have no information about other departments in the same stores on account of the clerical work necessary to compile the figures. Nor could we have secured the information more easily from any other store.

5. *The Difficulty of Ascertaining the Hours of Work.*

The mercantile law does not, like the factory law, require the employer to post the daily hours of the women employees, and to keep a time book of all employment outside of the posted period. These devices, contained in the labor law, enable the factory inspector to tell at a glance the working hours of every woman employed in a factory. Moreover, the merchants do not find it necessary in their own bookkeeping to keep an exact tally of the over-

time hours since they rarely pay their employees on a *pro rata* basis for the extra hours. Under these circumstances our inspectors encountered the greatest difficulty in determining the length of time the women worked. They were obliged to make use of time clock records, passes and lists of time keepers, supper passes, etc. Obviously such records giving, at best, only the hours of arriving and leaving work did not supply the necessary information without an elaborate computation of the total weekly hours. Sometimes our inspectors stayed on the premises in order to observe the time when the girls were dismissed. In many stores such observations were the only source of information. In not a single establishment were any records shown to us that corresponded to the posted notice and time book required in factories.

The detailed study of overtime in a number of departments of two large stores, given above, made clear this serious defect in the mercantile law. The amount of overtime was striking, but equally significant was the difficulty in obtaining the facts. In the absence of readily accessible records the mercantile inspector faces almost insuperable obstacles in enforcing the law regulating hours of labor.

If the mercantile law required the employer to post hours of work and keep a time book, it would not only simplify inspection but would relieve the merchants of the repeated visits of inspectors who, under present conditions, are obliged to return many times to make their observations and obtain the facts.

6. *The Effects of Overtime.*

The chief purpose of a study of overtime is not to ascertain merely the length of the working day. It must take into account also the effect of long hours on the workers. This may be imperceptible at first or if the overexertion is rare, but it cannot be disregarded if overtime frequently recurs or continues for long periods.

In department stores the exacting character of the work is, of course, accentuated by overtime. During the interval between Thanksgiving and Christmas, when hours of work and tension are most extreme, there is scarcely a girl who does not complain of the lassitude and lessened power for work experienced as a result.

From day to day the crush in the store increases, and the demands upon a girl's time and attention grow more insistent and unremitting. The air of the store is vitiated. There is rarely a moment to sit down and relax.

At 6 p. m. endurance has ebbed, and added evening work strains the physical and nervous powers almost to the breaking point. Girls ordinarily in good health complain that after the late return home their sleep is broken and unrefreshing. An employee writes:

"The work after supper takes it out of you worst of all. I got so tired and worried that I slept badly and dreamt a great deal about the store. In the morning when I woke up I felt as tired as the night before."

The girls who live at a distance from the store find their rest much cut down by evening work. They may reach home after 11 o'clock at night and yet have to return to their posts at 8 or 8:30 the following day. Every investigator commented on the intolerable hardship borne by such girls. In a store closing at 7 p. m. during Christmas week, an investigator reported that at her counter there were girls who lived in Staten Island, Brooklyn, Jersey City, and far uptown. "Many," she said, "who have luncheon at 11 o'clock have nothing to eat until they reach home at 8 or 9 o'clock in the evening." Another inside investigator employed in an establishment closing at 10 o'clock writes:

"Many girls had to go far uptown and some to Astoria, and didn't get home till after 11 p. m. I didn't see how they could get back to the store on time the next morning. But they had a sense of honor and wouldn't throw all the work on the other girls."

And a third investigator adds further evidence to that above:

"The girls are so tired that they need much sleep. When they only leave the store at 10:30 and perhaps don't reach home till past 11 p. m. they simply don't get enough sleep. With each day of evening work this lack of sleep accumulates so that they get tired more and more quickly."

When the night's rest is cut down for six nights or more without a break there is no opportunity to recover from the day's ex-

haustion. One inside investigator described a condition which was doubtlessly repeated in many other stores at this time of the year:

“In the toy department six girls out of twelve at the counter were forced to take a day off during the week December 16th to 21st on account of extreme fatigue. Four others were so tired and sick that they complained constantly and declared they would have to be absent some day before Christmas in order to stand the strain of the work. Two only were not tired to death. The girls, of course, lose pay when they are absent, but everyone of them said they ‘just couldn’t stand it’ without taking the day off, although none of them could afford this rest. Moreover when girls are absent, the burden of their work falls on the remaining salesgirls. Thus one day with three girls away there was such a constant rush that one girl said, ‘I didn’t have a chance to sit down from 9:15 till 6:45, except at lunch, and I didn’t see any other girl at the counter sitting down either.’”

Finally when the rush is over, Christmas Day is sometimes spent in bed, and for weeks thereafter the injury to health is still felt. One witness called before the Commission was asked:

“Q. How do you feel after those weeks overtime?

A. Well, I was home three months.

Q. As a result?

A. (Another witness) Yes, this girl has just broken down; down; she couldn’t stand it.”

And when a second girl was questioned as to whether she had ever received any sick benefits from the Mutual Aid Society in a certain large store, she replied:

“Certainly I did, because I worked night work one winter—— I worked night work regularly three nights a week (some nights four) from October until after Christmas.”

7. *Compensation for Overtime.*

It might be supposed that such long hours would be compensated by extraordinary rewards. Accordingly it is difficult to un-

derstand why it is the exception rather than the rule to pay for overtime. In factories it is customary to pay for evening work at least at the regular rate of wages, and very frequently the unusual character of the work is recognized by further extra pay. But in the mercantile establishments the old tradition survives that an employee is expected to stay until her job is finished, whatever the hour may be.

Particularly in the stores that are open regularly one to three nights a week, it is not customary to pay extra for evening work. The managers of some stores told inspectors that girls were hired on the understanding that they were to give additional time before the holidays or at special sales. Sometimes they added "the girls received a 'gift' from the firm at Christmas time."

The larger stores recognize the additional service to a limited extent by providing suppers free of charge or by paying supper money. The practice of giving supper in the store restaurant as payment for overtime is often resented by the employees. Of one store the inspector wrote: "supper cheques very unpopular as store restaurant suppers are considered poor." These suppers are very often poor and insufficient and at best can scarcely be considered adequate compensation.

Somewhat fairer is the payment of so-called supper money. In most stores this varied in amount from 25 to 35 cents. Eleven firms visited gave their employees 50 cents and two stores gave 75 cents. Many girls realize the insufficiency of such recompense. In most cases it covers only the cost of their supper, and they receive no reward for the extra service rendered.

Moreover, in the majority of stores neither supper nor supper money are given unless the women remain after 8 P. M. In one store, for instance, the girls said that if they stayed until 8 o'clock they were given 35 cents supper money; but the superintendent had a way of sending them home about 7:45 so that they received nothing for their extra time. In a few shops girls must remain even later to obtain supper money. A witness before the Commission testified that she worked in the auditing department "until nine o'clock without supper and 10 o'clock with supper." During the summer months she said, "They change the hours from eight to nine. That is, if you did three hours overtime till nine o'clock

they give you 35 cents, and if you live near enough to go home you would be in 25 cents."

Furthermore, many girls voluntarily forfeit the supper supplied in the store in order that they may be able to quit work somewhat earlier. One inspector reported that in a large store which requires a good deal of overtime at Christmas, the aisle manager decided towards the latter part of the afternoon how many girls must remain for evening work.

"He then asks these employees whether they will have supper and work late or whether they will keep straight on working without supper and go home a little earlier."

On the 14th of December the investigator reported that the number of "supperless employees" in this shop totalled 69. These figures were obtained from the store's own records.

Often a girl not only works overtime for an hour or more without pay, but she actually incurs additional expenses. Thus one employee reported to the Commission that she "had to buy supper" because where she lived they "served no supper after 7:30 P. M., but they made no allowance for that."

It should be noted that a girl who works overtime three hours one evening only may receive supper money as compensation, whereas a girl who works six or seven hours overtime on different evenings may receive nothing whatever for her extra services. Only two stores reported a *pro rata* payment for all overtime on week days; a few paid *pro rata* wages in certain departments, more especially in the offices.

In the majority of stores Sunday work, even if it does not last all day, is rewarded by a full day's pay. Yet in several even such overtime is (as one girl said) "supposed to be a courtesy to the house" and is paid for by free meals supplied by the firm. An inspector wrote of one large store: "No one was to be paid for Sunday work except clerical workers who receive a day's pay. Thirty-five cents in money is given for Sunday work when girls stay the whole day (9:30 A. M. to 5 P. M.), no pay at all when they work from 9 A. M. to 12 P. M."

In view of many conflicting reports for different stores and often for the same store, it is impossible to make any uniform

statement as regards payment for overtime. The following description is perhaps typical not only of the policies of a single store, but of the varying arrangements for overtime payment in all stores:

“Some of the employees say that they receive nothing for Sunday work, others say 35 cents, others 50 cents. Mr. B. (head of the firm) says all receive 50 cents. Some say they receive a day's pay; a few double pay — for which they mean a day's pay for a short day of 5 or 6 hours. Fines for lateness in morning, at option of head of department. Mr. B. says he plans to give all who have worked overtime 2 days vacation after January 1st, 1913, and those who are laid off will receive their overtime pay when they are laid off.”

8. *Summary.*

It is clear that the retail merchants face an extraordinarily difficult task in suddenly reenforcing their labor force to handle the Christmas trade. The rush season lasts about six weeks. Congestion of work is unavoidable unless an adequate number of extra workers is engaged to handle the increased volume of trade.

In every store additional help was secured to work during the Christmas holidays; in some the labor force was almost doubled. It is significant to note, however, that despite this increase only one department store and one five and ten-cent store reported employing two distinct sets of workers continuously throughout the six days preceding Christmas. The second shift went on at 6 P. M.. A few stores maintained a double shift for part of the period only. Others alternated their employees between a long and a short day, although all were at work until after 6 at night. Moreover, several stores dismissed younger employees at 6 o'clock as usual, and some instituted a shift in certain departments. But the employment of a double shift is not extensive enough to be further considered.

The difficulties of adjusting the labor supply are undoubtedly great. However, the facts show that the overtime of individuals is not solely demanded before Christmas but is a regular requirement at other seasons as well. In some departments it may be found every month. Clearly the merchants have not yet worked

out an equitable distribution of women's hours of work. They are overworked at certain seasons to an extent that admittedly affects their health.

VII. WAGES.

Of even greater importance than the demands of the work and the hours of labor, are the prevailing wages paid to girls and women employed in department stores. Their whole standard of living obviously is set by the adequacy or inadequacy of the wages. We have seen that during rush seasons the inroads upon the health of the workers are undeniable. It is, then, clearly of the highest importance that the vigor of the girls should be repaired as far as possible by nourishing and sufficient food. This is the most elementary requisite. A wage to be considered really adequate must assure the girls not only a minimum of food, but also an assured income for the other essentials of daily life: Lodging, car fares, clothes, recreation, and provision for possible sickness.

Wages in department stores depend largely on the supply of labor which the merchants can call upon. There is little difficulty in filling the low paid positions in stores, except at the time of extraordinary rush in the six weeks preceding Christmas. The labor force must then be largely increased within a few weeks. One large store, for instance, on one floor alone, where the toy department is located, took on 300 extra girls.

But ordinarily the line of applicants is more than sufficient to supply vacancies. The newcomers are, for the most part, unskilled. In many stores apparently no great effort is made to secure permanent and highly efficient help. This is proved by the great number of changes in department store personnel. No statistical study of the shift of employees could be undertaken in this inquiry. Judging from our own observations in the stores, we believe that the shifting is undoubtedly as extensive as it is in other cities. The study of a large Boston store,* for instance, shows that for 52.8% of the women employees receiving \$8.00 or less the average period of employment in a given year was 14 weeks. This calculation includes only regular employees, not the Christmas help. The report comments upon the demoralizing effect of such drifting.

* Report of the Massachusetts Commission on Minimum Wage Boards, 1912, page 130.

Our investigators ascertained the wages of 4,706 girls and women, of which 3,168 were saleswomen.

The wage tables given below have been compiled from one source only, namely, copies of store payrolls giving the actual wages paid to employees on successive weeks. The flat weekly wage obviously does not represent the real compensation which a girl receives for her labor. The actual amount contained in her pay envelope is the flat rate of pay with sundry deductions for fines or absence, and with the addition of possible commissions and bonuses. Thus only the payroll entries for the individual worker can give the figures from which her average earnings can be correctly calculated.

It was not possible to copy payrolls covering a whole year. Copies were made of payroll entries for five consecutive weeks beginning October 1, 1912. At this season of the year the stores are busy and their labor force is the largest that is permanently employed. But the extra help for the Christmas rush has not yet been taken on. By studying the payrolls at this season, we are dealing with the regular selling force. The "specials" who are taken on for special sales, the half-timers, and those who work only at night or on Saturdays were not included. Children under sixteen years were entirely omitted. Our data for five weeks can therefore be considered fairly representative of the earnings of the regular employees. As for those who shift from store to store, we have no data regarding the irregularity of their earnings.

The wages of no girl were copied from the payroll unless she was employed for the entire period of five weeks, nor was her record taken if she was absent for more than three consecutive days. This was judged a reasonable amount of absence. It is rather less than the government allowance of 30 days sick leave during the year without deduction of pay.

The 4,706 women whose earnings were thus ascertained from the payrolls were employed in 125 stores located in New York, Buffalo and Rochester, and in five cities of the second class: Albany, Troy, Schenectady, Utica and Syracuse. The tables afford an opportunity to compare wages in New York and in other cities. The average earnings have been compiled separately for two classes of mercantile establishments, the five and ten cent stores and the regular department stores.

Five and Ten Cent Stores.

There were forty-nine five and ten cent stores that opened their payrolls to us. They employed 1,038 women and girls, all of whom were salesgirls.

TABLE No. 9.

CUMULATIVE NUMBER AND PER CENT. OF SALESWOMEN EMPLOYED IN FIVE AND TEN CENT STORES ACCORDING TO EARNINGS AND ACCORDING TO CITIES.

| | AVERAGE WEEKLY EARNINGS. | | | | | Number of saleswomen. |
|------------------------|--------------------------|------------|------------|------------|---------------|-----------------------|
| | Under \$5. | Under \$6. | Under \$7. | Under \$8. | \$8 and over. | |
| | % | % | % | % | % | |
| New York city | 28.8 | 61.9 | 81.6 | 89.5 | 10.5 | 772 |
| Buffalo | 76.2 | 95.2 | 100.0 | 100.0 | ..... | 21 |
| Rochester | 24.2 | 72.5 | 89.0 | 95.6 | 4.4 | 91 |
| Second class cities... | 70.8 | 89.6 | 96.1 | 98.6 | 1.4 | 154 |
| All cities..... | 35.5 | 67.6 | 84.8 | 91.6 | 8.4 | 1,038 |

The employees of stores of this character are usually inexperienced, and no high grade of skill is required of them. It should be noted that the wages of no saleswoman whatever are omitted from this table. Women are thus included who are saleswomen and who, following the practice of these stores, also perform more responsible duties such as assisting the managers. Yet notwithstanding this inclusion of the higher paid workers, the meagerness of the wages is striking. 67.6% of the girls and women receive less than \$6 a week and 91.6% receive less than \$8. These figures speak for themselves. They scarcely need comment. It is clearly impossible for any woman to be self-supporting upon such a wage.

Department Stores:

Our tables of earnings compiled from regular department store payrolls are somewhat less representative than the table of wages in the five and ten cent stores.

Many of the dry goods merchants of the city of New York refused to permit us to examine their books, to ascertain the wages paid to their employees, but after negotiations they submitted to us certain tables of salaries of five different department stores in the city of New York selected by them which showed the wages paid to 4,000 employees. These tables show higher average wages

than those found by our own investigators in stores other than the five referred to. They came to us too late to be incorporated in the report proper, but will be found in the tables appended to this report.

Wage schedules were obtained for 10% of the total number of saleswomen employed in the department stores. A number of merchants, whose wages are probably among the highest of any paid by New York mercantile establishments, responded to our request for payrolls and at the other end of the scale, a number of firms who sell a cheaper grade of goods and pay lower wages also allowed us to copy their records. However, the data were not secured from the largest New York city establishments. For this reason these wage schedules may not be entirely representative of earnings throughout the department stores of the city. The largest stores are not included in which the largest proportion of young and lower paid workers are employed.

TABLE No. 10.
CUMULATIVE NUMBER AND PERCENTAGE OF SALESWOMEN EMPLOYED IN
REGULAR DEPARTMENT STORES ACCORDING TO EARNINGS
AND ACCORDING TO CITIES.

| | AVERAGE WEEKLY EARNINGS. | | | | | Number
of sales-
women. |
|-------------------------|--------------------------|---------------|---------------|---------------|------------------|-------------------------------|
| | Under
\$5. | Under
\$6. | Under
\$7. | Under
\$8. | \$8 and
over. | |
| New York city..... | 15.4 | 28.1 | 44.1 | 54.5 | 45.5 | 877 |
| Buffalo..... | 26.7 | 53.4 | 69.1 | 80.1 | 19.9 | 236 |
| Rochester..... | 9.2 | 21.7 | 38.4 | 50.0 | 50.0 | 120 |
| Second class cities.... | 22.1 | 38.2 | 54.4 | 64.7 | 35.3 | 1,497 |
| All cities..... | 20.3 | 35.4 | 51.1 | 61.9 | 38.1 | 2,730 |

Thus according to the chart, 20 per cent of all the saleswomen reported in all the cities earned less than \$5 per week. One-half of all the saleswomen (51.1%) earned less than \$7 and 61.9% earned less than \$8 a week.

In New York City, where living expenses are highest, the proportion of those earning less than \$7 was 44%. These wages, though higher than those paid in five and ten cent stores, are also clearly beneath the level of subsistence. Such is the income of these women. The Massachusetts Minimum Wage Commission estimated that \$9 to \$11 as a "living minimum wage for women."

In some way, therefore, the difference must be met between the ascertained earnings of these New York women and their necessary expenses of living.

The girls often live with such excessive economy and upon such short rations that health suffers and future earning capacity is permanently undermined. Thus the workers themselves are made to pay unfairly in strength and vigor, instead of receiving a living wage from the industry which employs them.

For exact knowledge of the ways in which these girls manage to live, a full study of income and outlay in individual cases is necessary. Such a budget study would have revealed the status of these workers — whether they were entirely dependent on their own earnings, whether they contributed to the support of the family, or whether they worked for pin money alone. As the time did not suffice for this extended inquiry, we must quote from other investigations of a similar character on these points.

The Massachusetts Report, together with the reports of the Federal Government on women in stores (Report on Woman and Child Wage Earners) disposes of the long-lived fallacy that the department store employees are working for pin money, and hence wages may safely be very low because they are not needed for actual self-support. Many store managers acknowledge that they prefer to engage girls who are living at home. The supposition is that they are then not dependent on their earnings.

Both of these official reports, after intensive study, prove that even when a girl lives at home her pay is, in an overwhelming majority of cases, not pin money for herself, but an indispensable part of the family income. The chief bread-winner is ill or disabled or is unable to support his wife and children by his own earnings. In many cases women employed in department stores are themselves the chief or sole wage-earners of the family. According to the Massachusetts Report, "throughout the cities of the state about one-quarter of the women workers in stores are dependent on their own resources."

And in Boston, for example, of the 2,276 women and girls employed in retail stores, only 3.3% were working for pin money. All the rest gave their pay envelopes to their families as a necessary part of the family income; or supported themselves entirely upon their own earnings. The United States Government report

gives approximately the same figures in New York City, namely, 3.7% pin money workers.

We have thus far considered the wages of saleswomen only, who constitute the best paid group within the stores. The earnings of other workers were also ascertained. In the large establishments where the work is most subdivided there are, besides saleswomen, two main groups — the office force and the stock girls. Of the 125 stores whose payrolls were copied, 69 employed women in their offices and only 20 employed stock girls.

The average weekly earnings of the office help are given below:

TABLE No. 11.

CUMULATIVE NUMBER AND PERCENTAGE OF OFFICE HELP EMPLOYED IN DEPARTMENT STORES AND FIVE AND TEN CENT STORES.

| | AVERAGE WEEKLY EARNINGS. | | | | | Number
of office
employees. |
|-------------------------|--------------------------|---------------|---------------|---------------|------------------|-----------------------------------|
| | Under
\$5. | Under
\$6. | Under
\$7. | Under
\$8. | \$8 and
over. | |
| New York city..... | %
14.1 | %
30.2 | %
51.6 | %
69.1 | %
30.9 | 149 |
| Buffalo..... | 33.3 | 50.0 | 53.3 | 63.3 | 36.7 | 30 |
| Rochester..... | 18.0 | 38.4 | 56.4 | 64.1 | 35.9 | 39 |
| Second class cities.... | 21.1 | 35.5 | 52.2 | 63.0 | 37.0 | 360 |
| All cities..... | 19.9 | 35.1 | 52.4 | 64.7 | 35.3 | 578 |

It is apparent that the range of wages of the 578 office workers included in this table corresponds closely to the wage scale of the saleswomen in the same stores.

But the younger workers who are employed as stock girls are paid markedly lower wages. The average weekly earnings of 326 are as follows:

TABLE No. 12.

CUMULATIVE NUMBER AND PERCENTAGE OF STOCK GIRLS EMPLOYED IN DEPARTMENT STORES ACCORDING TO EARNINGS AND ACCORDING TO CITIES.

| | AVERAGE WEEKLY EARNINGS. | | | | | Number
of
stock girls. |
|-------------------------|--------------------------|---------------|---------------|---------------|------------------|------------------------------|
| | Under
\$5. | Under
\$6. | Under
\$7. | Under
\$8. | \$8 and
over. | |
| New York city..... | %
96.3 | %
96.3 | %
98.1 | %
98.1 | %
1.9 | 54 |
| Buffalo..... | 85.7 | 92.8 | 100.0 | 100.0 | ..... | 14 |
| Rochester..... | 80.0 | 80.0 | 90.0 | 95.0 | 5.0 | 20 |
| Second-class cities.... | 94.1 | 97.9 | 99.5 | 100.0 | ..... | 238 |
| All cities..... | 90.1 | 93.2 | 98.7 | 99.3 | .7 | 326 |

It should be noted again that although these girls are undoubtedly young, yet all who are included here are over 16 years of age. They are usually not experienced and do not hold highly responsible positions, but their wages are exceedingly low; 93.2% earned less than \$6. In the absence of further data as to the age and rate of advancement of this group of workers, it is impossible to judge whether we are here considering an initial wage which will increase proportionally with the efficiency of the workers or whether this is, to some extent at least, a regular rate of pay for a body of workers whose chances of advancement are slight.

This inquiry into wages can be considered only the beginning of a full study. Though limited in scope it makes clear a few specific points: The five and ten cent stores pay the lowest wages, 85% of their saleswomen receive less than \$7.00. The other stores have a somewhat higher level of wages, yet 51% of the women are paid \$7.00 or less. In New York City wages are, on the whole, somewhat higher than in the other cities.

Since the earnings are not adequate for self-support, it is apparent that the standard of living in a large number of cases must be depressed below the level on which health and efficiency can be maintained. Yet the working efficiency of the individual is primarily dependent on her standard of living. The inadequacy of the wage is an evil which no amount of care in the sanitary appointment of the stores nor hospital service, nor welfare work can compensate for.

ADDENDUM

COMMUNICATION AND TABLES OF WAGES RECEIVED FROM DEPARTMENT STORES IN NEW YORK CITY.

Many of the drygoods merchants of the city of New York refused to permit the Commission to examine their books to ascertain the wages paid to their employees, but after negotiations they submitted certain tables of salaries of five different department stores in the city of New York selected by them which showed the wages paid to about 4,000 employees. These tables show higher average wages than those found by our own investigators in stores other than the five referred to. The Commission had no means of verifying these figures. They came too late to be incorporated in the report proper, but are given below, together with a letter from the counsel of the Retail Drygoods Association:

February 6th, 1913.

MR. ABRAM I. ELKUS,

170 Broadway, New York City:

DEAR SIR.—We have just received a draft of the portion of the proposed report of the Factory Investigating Commission dealing with the subject of wages in mercantile establishments. You will remember that the information desired by you with reference to the prevailing rate of wages in New York Department Stores, was set forth in a letter addressed by you to me, and subsequently, after conferences with Mr. Shientag, detailed reports were filed with you. These reports showed the facts as to the prevailing rates of wages in five typical department stores selected from different parts of the city. For obvious reasons, the stores furnishing this information did not desire their identity disclosed either directly or from the figures themselves, and accordingly you were first furnished with a statement giving the combined figures of all five stores in accordance with the classification requested by you. Thereafter, when your representative requested that separate figures be given as to each of these stores, we pointed out that the identity of the stores might become known from the figures themselves, and suggested that five separate reports would be furnished giving the percentages instead of the actual figures

in each instance. We were informed that this was satisfactory, and accordingly five separate reports giving separate percentages for each class of employees in each establishment were furnished.

We were never informed that this information was delivered too late for use in the preparation of the report of the Commission, nor were we ever informed that the department stores had not sufficiently complied with the request for information as contained in your letter.

An examination of the proposed report discloses that no use has been made of the data so furnished. The proposed report refers simply to results compiled from an examination of pay-rolls of only 877 saleswomen and 149 office help. The impression is given that the facts thus shown represent the prevailing condition in New York department stores. As a matter of fact, however, the data furnished by us has not been used, although it gives the figures with reference to 3,268 saleswomen and 814 office help, in five typical establishments taken from different parts of the city. The data thus furnished you was compiled directly from the books and records of these establishments, and there can be no question as to the accuracy of the information thus given.

We herewith enclose a table which we have prepared showing the difference in the results given in the figures embodied in the proposed report, and the result shown in the data which we have furnished, but which has not been used. Taking the case of saleswomen, by way of illustration: The figures contained in the proposed report based on a total of only 879 saleswomen, are as follows:

| | |
|----------------|-----------|
| Under \$5..... | 15 4/10%. |
| Under \$6..... | 28 1/10%. |
| Under \$7..... | 44 1/10%. |
| Under \$8..... | 54 1/2%. |
| Over \$8..... | 45 8/10%. |

The data furnished by us, covering a total of 3,268 saleswomen in given typical department stores, is as follows:

| | |
|----------------|------------|
| Under \$5..... | 0%. |
| Under \$6..... | 1/2 of 1%. |
| Under \$7..... | 8 4/10%. |
| Under \$8..... | 21 1/10%. |
| Over \$8..... | 78 9/10%. |

Similar differences appear in the figures contained in the proposed report with reference to other classes of employees and the figures embodied in the data furnished by us.

We call your attention to this situation, in order that you may be enabled to correct the serious misapprehension as to the true facts that would result from permitting this portion of the proposed report to remain in its present condition.

We respectfully submit that the data representing the facts with reference to the nominal number of employees mentioned in the proposed report, should not be dealt with as if the conditions thereby shown were typical of general conditions in the department stores in New York city. The data which has been furnished you, and which has not been used, clearly shows an entirely different state of affairs. . . .

We also note that in the proposed report data as to stock girls and packers have been combined, whereas in the information furnished by us the figures for wrappers and cash girls are given separately from those relating to stock girls, inasmuch as the latter receive higher compensation.

We respectfully request that the proposed report be corrected so as to embody a proper reference to the additional data which has been furnished, so that the actual condition of affairs existing in the department stores of this city shall be correctly indicated. We know that it is your desire that the proposed report shall be accurate and shall embody all the material that may be available to you for the purpose of correctly representing the conditions thereby covered.

We shall be glad to keep any appointment with you or your representatives, that you may fix for the purpose of facilitating the straightening out of this matter.

Yours truly,

(Signed) ROSE & PASKUS.

TABLES OF WAGES.

STORE No. I.

WEEK ENDING OCTOBER 19TH, 1912.

| WAGES. | Sales-
women. | Junior
sales-
women
(less than
one year's
experience). | Wrappers
and cash
girls. | Office
and audit
(including
tube
girls). | Stock. | Ship-
ping. |
|--------------------------------|------------------|---|--------------------------------|--|--------|----------------|
| Females under 16 years: | | | | | | |
| Under \$2.50..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$2.50 to \$2.99..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.00 to \$3.49..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.50 to \$3.99..... | ..... | ..... | 100% | 62.5% | ..... | ..... |
| \$4.00 to \$4.49..... | ..... | ..... | ..... | 37.5% | ..... | ..... |
| \$4.50 to \$4.99..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Over \$5.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ..... | ..... | ..... | 100% | 100% | ..... | ..... |
| Females over 16 years: | | | | | | |
| Under \$4.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$4.00 to \$4.99..... | ..... | ..... | 63.4% | 15.4% | 58.4% | ..... |
| \$5.00 to \$5.99..... | ..... | 37.5% | 29.3% | 6.2% | 28.6% | ..... |
| \$6.00 to \$6.99..... | ..... | 62.5% | 4.9% | 9.7% | 5.2% | ..... |
| \$7.00 to \$7.99..... | 6.7% | ..... | 2.4% | 5.1% | 5.2% | ..... |
| \$8.00 to \$8.99..... | 12.5% | ..... | ..... | 12.4% | 1.3% | ..... |
| \$9.00 to \$9.99..... | 14.8% | ..... | ..... | 16.5% | ..... | ..... |
| \$10.00 to \$10.99.. | 19.0% | ..... | ..... | 18.9% | 1.3% | ..... |
| \$11.00 to \$11.99.. | 8.4% | ..... | ..... | 5.6% | ..... | ..... |
| \$12.00 to \$12.99.. | 12.0% | ..... | ..... | 3.1% | ..... | ..... |
| \$13.00 to \$13.99.. | 2.8% | ..... | ..... | 1.0% | ..... | ..... |
| \$14.00 to \$14.99.. | 3.4% | ..... | ..... | 1.0% | ..... | ..... |
| Over \$15.00..... | 20.4% | ..... | ..... | 5.1% | ..... | ..... |
| ..... | 100% | 100% | 100% | 100% | 100% | ..... |

STORE No. II.

WEEK ENDING OCTOBER 19TH, 1912.

| WAGES. | Sales-
women. | Junior
sales-
women
(less than
one year's
experience). | Wrappers
and cash
girls. | Office
and audit
(including
tube
girls). | Stock. | Ship-
ping. |
|--------------------------------|------------------|---|--------------------------------|--|--------|----------------|
| Females under 16 years: | | | | | | |
| Under \$2.50..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$2.50 to \$2.99..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.00 to \$3.49..... | ..... | ..... | 32.6% | ..... | ..... | ..... |
| \$3.50 to \$3.99..... | ..... | ..... | 26.1% | ..... | ..... | ..... |
| \$4.00 to \$4.49..... | ..... | ..... | 23.9% | 100% | ..... | ..... |
| \$4.50 to \$4.99..... | ..... | ..... | 17.4% | ..... | ..... | ..... |
| Over \$5.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ..... | ..... | ..... | 100% | 100% | ..... | ..... |
| Females over 16 years: | | | | | | |
| Under \$4.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$4.00 to \$4.99..... | ..... | ..... | 80% | 4% | 20% | ..... |
| \$5.00 to \$5.99..... | ..... | 81.8% | 17.1% | 18% | 80% | ..... |
| \$6.00 to \$6.99..... | 17% | 18.2% | ..... | 24% | ..... | ..... |
| \$7.00 to \$7.99..... | 32.3% | ..... | ..... | 14% | ..... | ..... |
| \$8.00 to \$8.99..... | 24.9% | ..... | ..... | 20% | ..... | ..... |
| \$9.00 to \$9.99..... | 10% | ..... | 2.9% | 8% | ..... | ..... |
| \$10.00 to \$10.99.. | 7.4% | ..... | ..... | 6% | ..... | ..... |
| \$11.00 to \$11.99.. | 0.9% | ..... | ..... | 4% | ..... | ..... |
| \$12.00 to \$12.99.. | 3.9% | ..... | ..... | ..... | ..... | ..... |
| \$13.00 to \$13.99.. | 0.9% | ..... | ..... | ..... | ..... | ..... |
| \$14.00 to \$14.99.. | 0.9% | ..... | ..... | 2% | ..... | ..... |
| Over \$15.00..... | 1.8% | ..... | ..... | ..... | ..... | ..... |
| ..... | 100% | 100% | 100% | 100% | 100% | ..... |

1268 APPENDIX IX—MERCANTILE ESTABLISHMENTS.

STORE No. III.
WEEK ENDING OCTOBER 19TH, 1912.

| WAGES. | Sales-
women. | Junior
sales-
women
(less than
one year's
experience). | Wrappers
and cash
girls. | Office
and audit
(including
tube
girls). | Stock. | Ship-
ping. |
|--------------------------------|------------------|---|--------------------------------|--|--------|----------------|
| Females under 16 years: | | | | | | |
| Under \$2.50..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$2.50 to \$2.99.... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.00 to \$3.49.... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.50 to \$3.99.... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$4.00 to \$4.49.... | ..... | ..... | ..... | 100% | ..... | ..... |
| \$4.50 to \$4.99.... | ..... | ..... | ..... | ..... | ..... | ..... |
| Over \$5.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | | | | 100% | | |
| Females over 16 years | | | | | | |
| Under \$4.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$4.00 to \$4.99.... | ..... | ..... | 95.8% | 1.3% | 36.8% | ..... |
| \$5.00 to \$5.99.... | ..... | 100% | 4.2% | 22.6% | 63.2% | ..... |
| \$6.00 to \$6.99.... | 17.8% | ..... | ..... | 20% | ..... | ..... |
| \$7.00 to \$7.99.... | 16.4% | ..... | ..... | 23.9% | ..... | ..... |
| \$8.00 to \$8.99.... | 20.1% | ..... | ..... | 11.3% | ..... | ..... |
| \$9.00 to \$9.99.... | 15.9% | ..... | ..... | 3.1% | ..... | ..... |
| \$10.00 to \$10.99.. | 9.4% | ..... | ..... | 3.9% | ..... | ..... |
| \$11.00 to \$11.99.. | 2.5% | ..... | ..... | 2.6% | ..... | ..... |
| \$12.00 to \$12.99.. | 5.6% | ..... | ..... | 0.8% | ..... | ..... |
| \$13.00 to \$13.99.. | 1.1% | ..... | ..... | 1.3% | ..... | ..... |
| \$14.00 to \$14.99.. | 2.5% | ..... | ..... | 2.2% | ..... | ..... |
| Over \$15.00..... | 8.7% | ..... | ..... | 7% | ..... | ..... |
| | 100% | 100% | 100% | 100% | 100% | ..... |

STORE No. IV.
WEEK ENDING OCTOBER 19TH, 1912.

| WAGES. | Sales-
women. | Junior
sales-
women
(less than
one year's
experience.) | Wrappers
and cash
girls. | Office
and audit
(including
tube
girls). | Stock. | Ship-
ping. |
|--------------------------------|------------------|---|--------------------------------|--|--------|----------------|
| Females under 16 years. | | | | | | |
| Under \$2.50..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$2.50 to \$2.99.... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.00 to \$3.49.... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.50 to \$3.99.... | ..... | ..... | ..... | 5.4% | ..... | ..... |
| \$4.00 to \$4.49.... | ..... | ..... | ..... | 40.5% | 50% | ..... |
| \$4.50 to \$4.99.... | ..... | ..... | ..... | 54.1% | 28.9% | ..... |
| Over \$5.00..... | ..... | ..... | ..... | ..... | 21.1% | ..... |
| | | | | 100% | 100% | ..... |
| Females over 16 years. | | | | | | |
| Under \$4.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$4.00 to \$4.99.... | ..... | ..... | 10.8% | 6.2% | ..... | ..... |
| \$5.00 to \$5.99.... | 1.1% | 13.3% | 41.2% | 5% | ..... | 27.8% |
| \$6.00 to \$6.99.... | 8.1% | 75.2% | 10.3% | 8.2% | ..... | 22.2% |
| \$7.00 to \$7.99.... | 14.4% | 1% | 7.7% | 32.5% | 8.1% | 16.7% |
| \$8.00 to \$8.99.... | 15.6% | 10.5% | 8.3% | 20.1% | 30.2% | 33.3% |
| \$9.00 to \$9.99.... | 5.4% | ..... | 16.5% | 14.7% | 20.1% | ..... |
| \$10.00 to \$10.99.. | 15.6% | ..... | 2.6% | 1.8% | 17.5% | ..... |
| \$11.00 to \$11.99.. | 18.6% | ..... | ..... | 8.3% | 10.7% | ..... |
| \$12.00 to \$12.99.. | 4.2% | ..... | 2.6% | 2.9% | 6.7% | ..... |
| \$13.00 to \$13.99.. | 4.5% | ..... | ..... | ..... | ..... | ..... |
| \$14.00 to \$14.99.. | 5.6% | ..... | ..... | ..... | ..... | ..... |
| Over \$15.00..... | 6.9% | ..... | ..... | 0.3% | 6.7% | ..... |
| | 100% | 100% | 100% | 100% | 100% | 100% |

APPENDIX IX — MERCANTILE ESTABLISHMENTS. 1269

STORE No. V.
WEEK ENDING OCTOBER 19TH, 1912.

| WAGES. | Sales-
women. | Junior
sales-
women
(less than
one year's
experi-) | Wrappers
and cash
girls. | Office
and audit
(including
tube
girls). | Stock. | Ship-
ping. |
|--------------------------------|------------------|---|--------------------------------|--|--------|----------------|
| Females under 16 years. | | | | | | |
| Under \$2.50..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$2.50 to \$2.99..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.00 to \$3.49..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.50 to \$3.99..... | ..... | ..... | 36% | ..... | ..... | ..... |
| \$4.00 to \$4.49..... | ..... | ..... | 40% | ..... | ..... | ..... |
| \$4.50 to \$4.99..... | ..... | ..... | 19% | ..... | 33% | ..... |
| Over \$5.00..... | ..... | ..... | 5% | ..... | 67% | ..... |
|  | ..... | ..... | 100% | ..... | 100% | ..... |
| Females over 16 years. | | | | | | |
| Under \$4.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$4.00 to \$4.99..... | ..... | ..... | 12.3% | ..... | ..... | ..... |
| \$5.00 to \$5.99..... | ..... | ..... | 61.2% | ..... | ..... | ..... |
| \$6.00 to \$6.99..... | 1% | ..... | 9.2% | ..... | 13.1% | ..... |
| \$7.00 to \$7.99..... | 3.4% | ..... | 11.2% | ..... | 6.9% | ..... |
| \$8.00 to \$8.99..... | 8% | ..... | 5.1% | ..... | 18.8% | ..... |
| \$9.00 to \$9.99..... | 5.3% | ..... | 1% | ..... | 17.5% | ..... |
| \$10.00 to \$10.99..... | 11% | ..... | ..... | ..... | 8.7% | ..... |
| \$11.00 to \$11.99..... | 7% | ..... | ..... | ..... | 6.9% | ..... |
| \$12.00 to \$12.99..... | 13% | ..... | ..... | ..... | 6.2% | ..... |
| \$13.00 to \$13.99..... | 5.3% | ..... | ..... | ..... | 2.5% | ..... |
| \$14.00 to \$14.99..... | 7% | ..... | ..... | ..... | 5% | ..... |
| Over \$15.00..... | 39% | ..... | ..... | ..... | 14.4% | ..... |
| | 100% | ..... | 100% | ..... | 100% | ..... |

FOR THE FIVE STORES COMBINED.
WEEK ENDING OCTOBER 19TH, 1912.

| WAGES. | Sales-
women. | Junior
sales-
women
(less than
one year's
experi-
ence). | Wrappers
and cash
girls. | Office
and audit
(including
tube
girls). | Stock. | Ship-
ping. |
|--------------------------------|------------------|--|--------------------------------|--|--------|----------------|
| Females under 16 years. | | | | | | |
| Under \$2.50..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$2.50 to \$2.99..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.00 to \$3.49..... | ..... | ..... | 15 | ..... | ..... | ..... |
| \$3.50 to \$3.99..... | ..... | ..... | 102 | 7 | ..... | ..... |
| \$4.00 to \$4.49..... | ..... | ..... | 42 | 23 | 23 | ..... |
| \$4.50 to \$4.99..... | ..... | ..... | 23 | 20 | 11 | ..... |
| Over \$5.00..... | ..... | ..... | 4 | ..... | 16 | ..... |
| Total..... | ..... | ..... | 186 | 50 | 50 | ..... |
| Females over 16 years. | | | | | | |
| Under \$4.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$4.00 to \$4.99..... | ..... | ..... | 155 | 56 | 54 | ..... |
| \$5.00 to \$5.99..... | 15 | 50 | 161 | 90 | 42 | ..... |
| \$6.00 to \$6.99..... | 257 | 91 | 31 | 105 | 25 | ..... |
| \$7.00 to \$7.99..... | 417 | 1 | 27 | 182 | 27 | ..... |
| \$8.00 to \$8.99..... | 493 | 11 | 21 | 128 | 76 | ..... |
| \$9.00 to \$9.99..... | 288 | ..... | 34 | 93 | 58 | ..... |
| \$10.00 to \$10.99..... | 442 | ..... | 5 | 55 | 41 | ..... |
| \$11.00 to \$11.99..... | 362 | ..... | 0 | 47 | 27 | ..... |
| \$12.00 to \$12.99..... | 237 | ..... | 5 | 18 | 20 | ..... |
| \$13.00 to \$13.99..... | 116 | ..... | ..... | 5 | 4 | ..... |
| \$14.00 to \$14.99..... | 154 | ..... | ..... | 8 | 8 | ..... |
| Over \$15.00..... | 487 | ..... | ..... | 27 | 33 | ..... |
| Total..... | 3,268 | 153 | 439 | 814 | 415 | ..... |

1270 APPENDIX IX — MERCANTILE ESTABLISHMENTS.

FOR THE FIVE STORES COMBINED.

WEEK ENDING OCTOBER 19TH, 1912.

| WAGES. | Sales-
women. | Junior
sales-
women
(less than
one year's
experi-
ence). | Wrappers
and cash
girls. | Office
and audit
(including
tube
girls). | Stock. | Ship-
ping. |
|--------------------------------|------------------|--|--------------------------------|--|--------|----------------|
| Females under 16 years. | | | | | | |
| Under \$2.50..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$2.50 to \$2.99..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$3.00 to \$3.49..... | ..... | ..... | 8.1% | ..... | ..... | ..... |
| \$3.50 to \$3.99..... | ..... | ..... | 54.9% | 14% | ..... | ..... |
| \$4.00 to \$4.49..... | ..... | ..... | 22.6% | 46% | 46% | ..... |
| \$4.50 to \$4.99..... | ..... | ..... | 12.3% | 40% | 22% | ..... |
| Over \$5.00..... | ..... | ..... | 2.1% | ..... | 32% | ..... |
| Total..... | ..... | ..... | 100% | 100% | 100% | ..... |
| Females over 16 years. | | | | | | |
| Under \$4.00..... | ..... | ..... | ..... | ..... | ..... | ..... |
| \$4.00 to \$4.99..... | ..... | ..... | 35% | 6.9% | 13% | ..... |
| \$5.00 to \$5.99..... | 0.5% | 32.6% | 36.7% | 11.1% | 10.1% | ..... |
| \$6.00 to \$6.99..... | 7.9% | 59.5% | 7.5% | 12.9% | 6% | ..... |
| \$7.00 to \$7.99..... | 12.7% | 0.7% | 6.1% | 22.3% | 6.5% | ..... |
| \$8.00 to \$8.99..... | 15% | 7.2% | 4.8% | 15.7% | 18.3% | ..... |
| \$9.00 to \$9.99..... | 8.8% | ..... | 7.7% | 11.4% | 14% | ..... |
| \$10.00 to \$10.99..... | 13.5% | ..... | 1.1% | 6.8% | 9.9% | ..... |
| \$11.00 to \$11.99..... | 11.1% | ..... | ..... | 5.8% | 6.5% | ..... |
| \$12.00 to \$12.99..... | 7.3% | ..... | 1.1% | 2.2% | 4.8% | ..... |
| \$13. to \$13.99..... | 3.5% | ..... | ..... | 0.6% | 1% | ..... |
| \$14.00 to \$14.99..... | 4.7% | ..... | ..... | 1% | 1.9% | ..... |
| Over \$15.00..... | 15% | ..... | ..... | 3.3% | 8% | ..... |
| Total..... | 100% | 100% | 100% | 100% | 100% | ..... |

APPENDIX X

BRIEFS AND MEMORANDA

I

The New Statute for the Protection of Child-Bearing Factory-Workers and Means of Making it Effective

By EDWARD BUNNELL PHELPS,

Editor, The American Underwriter, and Author of "A Statistical Study of Infant Mortality," "Infant Mortality's Urgent Call for Action," "Infant Mortality and Its Relation to Woman's Employment," "The World-Wide Effort to Diminish Infant Mortality," Etc.

For at least half a century the heavy infant mortality in manufacturing districts, and its unquestionable relation with women's work, has been a prolific subject of discussion with health officials and medical authorities on the other side of the Atlantic, and the pioneer Swiss statute prohibiting the employment in factories of child-bearing women for eight weeks before and after confinement dates back more than thirty-five years. This statute (section 15) became part of the Federal Law on March 23, 1877, and less than five years later the eminent English economist, Dr. William Stanley Jevons, published in the *Contemporary Review*, of January, 1882, an exhaustive paper on "Married Women in Factories," in which he gave considerable attention to the necessity for, and prospect of, similar legislation by the British Parliament. The paper in question is included in the volume of reprints of his papers published in 1883 under the title of "Methods of Social Reform," and appended to it in the volume in question is the following note bearing the initials of his widow:

NOTE.—During the last few weeks of his life (Prof. Jevons was drowned in August, 1882) my husband was much occupied with the question of infant mortality, as he had undertaken to prepare a paper on that subject for the meeting of the Social Science Association, held at Nottingham last September. That paper was never to be written, and the results of his many hours of labour were therefore lost. I can only say here that he had most carefully examined into the statistics of infant mortality in every town

of every county throughout England and Wales, and that he told me that he thought from this exhaustive inquiry he should be able to give most convincing proof of the influence which the absence of the mother at work has upon the death rate of the children, and of the urgent need which exists for legislation upon the subject.

H. A. J.

It was unfortunate that Dr. Jevon's intended paper of thirty years ago was destined to die in the making, as the results of such a man's investigation might have proved an important and far-reaching contribution to the literature of the subject. But, even in his preliminary paper on "Married Women in Factories" there were many rays of light on the subject then comparatively a new subject, and some of the paragraphs in question, written for English readers and more than thirty years ago though they were, are entirely applicable to the situation created by the new New York law in relation to child-bearing women's employment in factories, mercantile establishments, mills and workshops. As the carefully-thought-out conclusions of a distinguished economist they are herewith reproduced, and read as follows:

"It is the class 'child-bearing women,' that legislation must deal with, if at all. Opinions will differ greatly, however, as to the extent, means, and purpose of the legislation required. The slightest form of interference would consist in excluding women from factories for a certain number of weeks before and after confinement. Mr. Mundella explained to the Factory Acts Commission of 1875 that in Glarus, and some other Swiss Cantons, a woman was obliged to remain at home for six weeks in all, fixing the time at her own discretion. There can be so little doubt as to the hygienic advantages of such a law, that the only question seems to be the possibility of enforcing the law. What is practicable in a small mountain district like Glarus, where everybody knows everybody else, might totally fail in an ocean of population like that of Lancashire or London. It will be generally agreed that the employer can hardly be made responsible for delicate inquiries into the condition of his female mill-hands. The Factory Act Commissioners bring forward, moreover, other serious difficulties; for in-

stance, the danger of adding a new and very powerful motive for concealment of birth.

“ It appears pretty plain that if there is to be legislation concerning child-bearing women something more thorough is required. The women may be quite fit for work in one month; but what about the infant? The latter is pretty sure to be relegated to that scourge of infant life, the dirty fungus-bearing bottle. I do not think that it will be possible for the Legislature much longer to leave untouched the sad abuses which undoubtedly occur in the treatment of infants, especially in the manufacturing districts. The existence of such abuses is sufficiently indicated by the high rate of infant mortality already alluded to. (Pp. 155-6.)

“ It seems impossible, then, not to concede that the employment of child-bearing women leads to great abuses; and when these abuses reach a certain point, they may become all that is needed to warrant legislation. As to the exact form which such legislation should take, inquiry, if not experiment, must guide us. The law of Switzerland and some foreign countries (Note. This statement was written as long ago as 1881, and published in 1882), even if it could be carried out in our populous towns, seems to be inadequate. Probably it would be well to impose restrictions and penalties upon the negligent treatment of infants, without waiting until the case ripens for the coroner's court. It ought to be a punishable offence to shut very young children up in a house alone, or otherwise to abandon them for any considerable length of time, except, of course, under the pressure of emergency. But I go so far as to advocate the *ultimate complete exclusion of mothers of children under the age of three years from factories and workshops*. (Pp. 166-7.)

“ Although the complete exclusion of child-bearing women from factory employments is the object to be aimed at, the violence of the change might be mitigated for a time. Licenses might be given to particular large factories to employ such women on the condition that they establish on or close to their premises *crèches* under constant medical supervision, where the mothers might visit their infants at intervals during the day. This plan has been adopted by some of the wealthy and benevolent manufacturing firms in France, and is said to have produced most beneficial results. (See

Transactions of the Manchester Statistical Society, 1868-9, p. 10.) But no such *crèche* should be allowed to exist except under direct Government inspection, and, in any case its existence should be regarded as a transitional measure.

“Widows and deserted wives would need to be gently dealt with; if, having a numerous family, they ought to have poor-law relief, to be added to the small earnings which they can make by home employment. In the long run it would pay for the State to employ them as nurses of their own children. Where there are only one or two infants, the mother might be allowed to deposit them for the day at a *crèche*, established for and restricted solely to such cases, or at employers’ *crèches*, just mentioned. (P. 169.)

“The objection may no doubt be made, that the exclusion of child-bearing women from works in public factories would be a new and extreme case of interference with the natural liberty of the individual. Philosophers will urge that we are invading abstract rights, and breaking through the teachings of theory. Political economists might, no doubt, be found to protest likewise that the principles of political economy are dead against such interference with the freedom of contract. But I venture to maintain that all these supposed natural entities, principles, rules, theories, axioms, and the like, are at the best but presumptions or probabilities of good. There is, on the whole, a certain considerable probability that individuals will find out for themselves the best paths in life, and will be eventually the best citizens when left at liberty to choose their own course. But surely probability is rebutted or destroyed by contrary certainty. If we find that freedom to work in factories means the destruction of a comfortable home, and the death of ten out of twelve of the offspring, here is a palpable evil which no theory can mitigate. What can be more against all principle, all right, nature, duty, law, or whatever else is thought to be most immutable and sacred, than that a mother should learn to hear ‘with nonchalance’ that her infant had died at the nursing-house, while she herself was at the factory? The social system, like the human frame, may become so far diseased that the intervention of the physician is imperative.

Speaking of liberty and rights, it must be apparent, too, that the parties most seriously concerned in the matter are

the infants. They have no means of raising a public agitation, or, if they venture to protest in their own manner, are soon stilled with 'Godfrey.' But surely if there is any right which is clearly founded in the natural fitness of things, it is the right of the infant to the mother's breast. She alone can save from virtual starvation and death. She alone can add inches to the stature, fulness to the muscles, and vigour to the mind. It is in the present state of things that rights and principles are most flagrantly cast aside. (Pp. 170-1.)"

These opinions and conclusions are not those of an agitator, or jaundiced and perennial critic of society, but are the sane and sober utterances of a recognized thinker and economist. And, even at the risk of encroaching on the space assigned to me, I have deemed it well worth while to reproduce them *verbatim* by way of prelude to my response to the request which I received from the Factory Investigating Commission for "your views and suggestions concerning the means that should be adopted to protect pregnant women in factories and manufacturing establishments." This request, of course, was apropos of the enactment at the instance of the Commission of the new law of New York State (chapter thirty-six of the laws of nineteen hundred and twelve, section 93-a), which provides:

Employment of females after childbirth prohibited. It shall be unlawful for the owner, proprietor, manager, foreman or other person in authority of any factory, mercantile establishment, mill or workshop to knowingly employ a female or permit a female to be employed therein within four weeks after she has given birth to a child. This act shall take effect immediately.

In effect, if not in words, this act is practically a reproduction of the British law, first included in the Factory Act of 1891 (section 17) and subsequently in the Act of 1901 (section 61), which provides that "an occupier of a factory or workshop shall not knowingly allow a woman or girl to be employed therein within four weeks after she has given birth to a child." The last fifteen words in the British and New York statutes are identical, in each of the statutes in question the word "knowingly" is included, and the close relationship of the laws is obvious.

The New York law is the second of the kind to be enacted in this country, the first of the kind being the Massachusetts statute, approved March 31, 1911, which reads as follows:

Section 1. No woman shall knowingly be employed in laboring in a mercantile, manufacturing or mechanical establishment within two weeks before or four weeks after childbirth.

Section 2. The foregoing section shall be included in the notice with regard to the employment of women now required to be posted in mercantile, manufacturing and mechanical establishments, and the provisions thereof shall be enforced by the district police.

Section 3. Violations of section one of this act shall be punished by a fine not exceeding one hundred dollars.

Section 4. This act shall take effect on the first day of January, nineteen hundred and twelve.

As above stated, the Massachusetts statute was the first law ever adopted in this country directly or indirectly dealing with this phase of women's work, but many—in fact, a decided majority—of the European nations, following the Swiss Federal Act of 1877, have for many years had on their statute books laws prohibiting the employment of child-bearing women for varying periods immediately following—and in some cases, preceding—their confinement. In the course of my investigation of the subject of infancy mortality I had become familiar with the laws in question, and the literature on the subject, became convinced of the eminent desirability of legislation on these lines, and at the Conference on Uniform Legislation at Washington, on January 17-19, 1910, called by the National Civic Federation—to which I had been appointed a delegate by the American Statistical Association—acting only in my personal capacity, I introduced a resolution recommending the enactment of a uniform law in the States of this country prohibiting the employment of child-bearing women under certain conditions. The resolution was tabled by the committee on resolutions, but was the first recommendation of the kind, in so far as I have been able to learn, ever brought before any national body in this country, and, although not

adopted, is herewith reproduced in order to complete the record of legislation, or attempted legislation, on these lines in this country up to date:

WHEREAS, Not only the appalling infant mortality but the health of the nation and the very future of the human race demand the alleviation in so far as practicable of the painful conditions of child-bearing and infant life in the ranks of working women, whose well-known fertility is the only safeguard against the world's declining birth-rate; and

WHEREAS, Practically all the nations of Europe long since recognized the vital importance of prohibiting by statute the employment of child-bearing women in factories and workshops for at least a specified number of weeks after — and in some cases, before — their confinement, but as yet no prohibition of the kind has been included in the labor laws of this country, although more than one million females of sixteen years and over — or more than one-fifth of the working women of the United States — are employed in factories and workshops; and

WHEREAS, The exigencies of business competition between the several manufacturing States obviously make imperative the general adoption of the prohibition in question if the eminently-desirable result is to be attained; therefore,

Be It Resolved, That this Conference of the National Civic Federation earnestly recommends the general adoption of a law prohibiting the employment of child-bearing women in factories and workshops within one month before, and two months immediately following, their confinement; and,

Be It Further Resolved, That the Conference also recommends the enactment of a supplemental uniform law providing that all employers of this class of labor, by means of contributory insurance of their female help or by such other means as they may see fit to adopt, shall provide for the creation of maternity funds out of which the child-bearing female employees shall be paid at least one-half of their several wages during the period of their prescribed withdrawal from their labor in factory or workshop.

In the last clause of the preceding resolutions, in my judgment is to be found the keynote to successful legislation on these lines

— in fact, the prerequisite for all effective legislation of the kind — to wit, provision for the creation and maintenance of a maternity fund, out of which the wages, in whole or part, of child-bearing factory women may be paid during their legally-prescribed rest immediately preceding or following confinement. Practically all of the authorities on, or students of, the subject are agreed that the maintenance of some form of maternity fund is the inseparable complement of the prohibition of employment of child-bearing women, or, in other words, that it is futile to attempt to debar from work which they can obtain female factory workers, many of whom have no other source of income than the wages which they thereby earn. However urgent the occasion for the child-bearing women of this class to rest from their labor for the time being — urgent for them as well as for the babies which they have just brought into the world — the stern logic of necessity tells many of them that under present conditions in this country they must either work or starve. And it is inevitable that women so unfortunately situated will work up to practically the last minute before child-birth, and drag themselves back to work at the very first opportunity after it, whatever the physical results to them and their babies may be.

Should they find that their employers were disposed to live up to the spirit of the law prohibiting their employment for four weeks after child-birth, immediately would loom up, as Dr. Jevons suggested, “the danger of adding a new and very powerful motive for concealment of birth.” If concealment of birth, or false statements as to the date of birth, did not suffice to secure the coveted re-employment, the child-bearing woman would naturally have a powerful incentive to cross the State-line, and secure employment in a similar industry in an adjoining State in which no laws regarding the employment of child-bearing factory women were in force. In short, in this country at least, with its fifty or so sets of labor laws, it would seem to be practically useless to endeavor by statutory measures to stem the tide of self-preservation, and prevent factory-working women in one way or other finding the level fixed for them by sheer necessity. In so stating the case, I have no thought of reflecting on the new law of New York State whose enactment by the Legislature and approval by

the Governor in my opinion constitute a most important forward move in the labor legislation of this country. But it is necessary that the present situation should be pictured exactly as it is, however unpleasant the picture may be for the moment, if the necessities of the case are to be recognized, and the imperative supplemental legislation secured without needless loss of time.

More than twenty years' experience with the substantially identical British law has demonstrated that the presence of the word "knowingly" in the statute makes it practically inoperative and impotent. As that well-known English authority on Infant Mortality, Dr. George Newman, puts it in his standard work on "Infant Mortality—A Social Problem," "it has been found in practice that the word 'knowingly' suggests an adequate defence for culpable negligence, so that it is extremely difficult in many cases to bring home the responsibility of such employment to the actual offending manager or foreman. At present section 61 is being considerably evaded, which indicates negligence, at least, on the part of employers, and in some degree ignorance on the part of mothers, although there is no doubt that it is often a question of working or starving. 'The spirit, if not the letter,' reported Miss Anderson, Principal Lady Inspector of Factories, 'of the present law is broken.'" (Pp. 270-1.) In addition to branding the law of England as practically futile, Dr. Newman, as will be noted, makes substantially the same statement as was made by me on a previous page, namely, that, as the women to whom the law applies look at it, "it is often a question of working or starving." Various other authorities might be cited on these two points, the use of the word "knowingly" in the statute, and the fearful dilemma for many women of "work or starve," but the facts in the case are so self-evident as to make entirely unnecessary the citation of further authorities. In that event, the only question remaining, and the all-important one, is, how may the pioneer law be so utilized, or amended, as to serve the purpose of its enactment?

The answer to that question seems to me almost instantly patent, to wit, first, concentrate public attention on the enactment and pressing necessity for the pioneer American laws of those two all important States, Massachusetts and New York, and combine

these pioneer statutes as a lever for lifting this country on these lines to the level of the rest of the civilized world, just as has been done, or is now doing, in the case of Workmen's Compensation; secondly, with the help of the sentiment thus created, bring about the adoption of the supplemental legislation imperatively needed to protect the factory-working mothers, and thus consummate the purpose of the movers of the Massachusetts and New York laws.

This country is now passing through an era of constructive legislation, especially in the field of social betterment. The atmosphere is heavily charged with the reform spirit, and it should not be difficult to make the child-bearing factory-women movement part and parcel of the present reform crusade. As yet the public has heard practically nothing of it, and has no conception of its far reaching importance, but with the magic wand of Publicity miracles may be accomplished in short order in this country. Suppose the Factory Investigating Commission, for instance, were to prepare a concise, readable, summary of the situation, and of its successful preliminary move on these lines, place it in the hands of all the leading humanitarian and labor organizations of the State, and strive to enlist the support of the leading newspapers of the State. Suppose the Commission, or some organization or newspaper acting in its behalf, were to circularize the manufacturers and other large employers of female labor, and try to get them fairly and squarely committed for, or against, carefully thought-out measures on these lines. Can anyone doubt the ultimate effect of such a campaign?

In my judgment there are two vital points which should be made in such a campaign: first, the fact that practically all the other civilized nations are far ahead of the United States in their statutory protection of child-bearing factory-women; secondly, the fact that the total outside cost of the maternity fund which is a prerequisite of an effective law on these lines would by no means be a serious obstacle, but practically an infinitesimal item, as I shall subsequently demonstrate. The showing, the proving, of the first-named fact would go a long way to shaming the American public, and American legislators, into action; the demonstration of the second fact, the comparatively petty cost of a liberal maternity fund, would do much to dispel the alarm of manufacturers,

and other employers of female labor, who in their ignorance of the subject would naturally be inclined to fear the cost consequences of the proposed innovation.

Now, as to the first point, the backward position of the United States as compared with that of other civilized countries. Austria, Belgium, Bosnia, Denmark, France, Germany, Great Britain, Holland, Italy, Norway, Roumania, Spain, Switzerland, and even Russia have long had either laws, or widely followed practices, for the protection of child-bearing women in factories which, as yet, are practically undreamed of in this country. Even in far-away Argentina for nearly five years there have been in force in the capital of the republic special ordinances which provide that "in businesses where women are employed, mothers shall be allowed to nurse their infants for fifteen minutes in every two hours; the time so allowed shall not be deducted from the time prescribed for rest." In all of the countries named the employment of women in factories for at least four weeks after confinement is prohibited, with the exception of Russia, which has no national law on the subject, but the Factory Commissions of the Provinces of St. Petersburg, Moscow, and Warsaw require maternity wards in factories employing considerable numbers of workers, and some commissions have established a maximum time limit of three months for this free medical help. In Germany the elaborate system of *Krankenversicherungsgesetz* (Law of Insurance against Sickness) grants to lying-in women for a period of six weeks an allowance equal in amount to one-half the average day's wages of the locality, the system applying to women in factories and workshops and employed in home industries.

Both Denmark and Norway provide for financial aid for the mothers prohibited from employment, when such aid is necessary, and in neither case is the aid so given to be considered as "poor relief." It is in Italy, however, that by far the most advanced provision is now made for a maternity fund for the support of working women in case of child-birth. The present law for the establishment of a national maternity fund was enacted on July 17, 1910, after a protracted discussion of the subject reaching back about fifteen years, and thus was established the first national institution for maternity insurance in the world. The employer,

the employee, and the State contribute to the fund, the annual contribution for women between 15 and 20 being one *lira* (19.3 cents), and for women between 20 and 50 two *lire* (38.6 cents), of which one-half is paid by the employer. The State adds a contribution of ten *lire* (\$1.93) in each case, or one-fourth of the total of forty *lire* (\$7.72), which is paid to each working woman in case of child-birth, on condition that she discontinue work for seven weeks.

A very important phase of the agitation culminating in the enactment of this progressive law of Italy was the investigation conducted by the Italian Bureau of Labor in 1903, by direction of the Minister of Agriculture, Industry and Commerce, for the purpose of ascertaining the probable cost of the maternity fund then proposed, which was to allow maternity benefits of either one-half or three-quarters of the beneficiary's wages for thirty days. The investigation covered the year December 1, 1902, to November 30, 1903, included 172,365 female employees between ages 15 and 54 in 2,654 establishments, and showed that the birth-rate per 1,000 full-year workers of those ages would be about 45, and that the payment for thirty days to each of the mothers of one-half or three-quarters of her regular wages would cost, respectively, $\frac{3}{10}$ and $\frac{45}{100}$ of one per cent of the payroll of the female full-year workers. This investigation was the only one of the kind ever made — certainly the only one on any such large scale — and furnishes a most important check on the calculation of the probable cost of half-wages for ten weeks in the case of each child-bearing factory worker in the United States which I made before introducing at the Conference of the National Civic Federation, in January, 1910, the resolutions presented on previous pages of this paper.

On the basis of the utterly insufficient and unsatisfactory data available for this country, I then figured, and so informed the delegates to the conference, that the payment of half-wages for ten weeks to child-bearing factory women in this country probably would not exceed one-half of one per cent of their total payroll, or, in other words, that the payment of full wages for ten weeks would probably amount to not more than one per cent of the payroll of female factory workers. The results of the Italian inves-

tigation of 1903 were not then known in this country, and did not make their appearance in any English work until they were published in the Twenty-fourth Annual Report of the U. S. Commissioner of Labor, in September, 1911. Making allowance for the difference between the exceptionally high birth-rate of Italian working women and the presumptive birth-rate of factory workers in this country, the Italian Bureau of Labor's findings would seem approximately to justify my conclusions that the payment for ten weeks of full wages to American factory-working mothers would not exceed one per cent of their combined annual payroll.

The wages paid to, and the conditions governing the employment of, American factory-working women are so materially different from those in the case of the working women of Italy, that the results of the investigation by the Italian Bureau of Labor may not convince American employers of their applicability in this country. By way of demonstration, therefore, that the percentage of cost of a permanent maternity fund for the protection of factory-working women in this country would not materially exceed that shown by the Italian investigation of some years ago, a concise tabular summary of the probable approximate experience in this country is herewith submitted. The returns of the Twelfth Census, of 1900, being the latest detailed figures for the country as a whole as yet available, the appended computation is made on the basis of the census figures for 1900:

| | |
|---|-----------|
| Assumed number of births in the United States in 1900, estimated on basis of apparent birth-rate of 35.1 per 1,000 of mean population... | 2,644,512 |
| Approximate number of married women of child-bearing ages, 16-44 years, inclusive..... | 9,791,272 |
| Apparent birth-rate per 1,000 married women of ages 16-44, inclusive..... | 270 |
| Total number of women of ages 16-44, inclusive, employed in manufacturing and mechanical pursuits | 1,071,467 |
| Probable number of married women in preceding group, estimated on basis of ratio of married women of all ages to total number of women thus employed, namely, about 13 per cent.... | 139,291 |

| | |
|---|------------------|
| Apparent number of births to the married women between ages 16-44, inclusive, employed in manufacturing and mechanical pursuits, calculated on basis of the birth-rate of 270 for all married women of those ages.... | 37,609 |
| Total annual payroll of the 1,071,467 women between ages 16-44 employed in manufacturing and mechanical pursuits on basis of \$6 per week, or \$312 per year..... | \$334,297,704 00 |
| Total annual cost of payment of full wages at \$6 per week for 10 weeks to each of the 37,609 women employed in manufacturing and mechanical pursuits presumably bearing children, | \$2,256,540 00 |
| Total cost of maternity benefits, allowing margin of 25 per cent. additional for expense of collection, disbursement, bookkeeping, etc... | \$2,820,675 00 |
| Ratio of cost to annul payroll on this basis... | about 0.84% |

It will be recalled that the Italian investigation discovered an apparent birth-rate of 45 per 1,000 full-year workers between ages 15-54, inclusive, which was equivalent to one of about 40 per 1,000 of the total number of female workers in the field of investigation. The preceding approximate tabulation for the United States which I have worked out on the basis of the figures of the Twelfth Census tentatively suggests 37,609 births for 1,071,467 female workers between ages 16-44, inclusive, engaged in manufacturing and mechanical pursuits, or a birth-rate of 35.1 per 1,000, but unquestionably the actual birth-rate per 1,000 was considerably higher for the reason that in the case of all married women in the United States between ages 16-44, inclusive, only about 21 per cent were included in the group between ages 16-24, inclusive, whereas no less than about 56 per cent of all the women between ages 16-44, inclusive, engaged in manufacturing and mechanical pursuits were in that most fertile group of child-bearing women. By way of allowing a liberal margin for safety, suppose that the apparent birth-rate of 35.1 per 1,000 women of ages 16-44, inclusive, engaged in manufacturing and mechanical pursuits is lifted to 40 per 1,000. The Italian birth-rate is notoriously high, and this assumption of a similar birth-rate for

American factory-working women of child-bearing age would seem to be a particularly liberal one. Applying that rate to the 1,071,467 women of child-bearing age in the American factory-working class, there would apparently be 42,859 births among them in the course of a year, and ten full weeks' wages at \$6 per week to each of these 42,859 mothers would amount to \$2,571,540. Making the former liberal allowance of 25 per cent for the possible expenses of the maternity fund, the total annual cost of the fund would be \$3,214,425, or about 96/100 of one per cent of the annual payroll of these 1,071,467 working women, equivalent to an annual per capita cost of almost exactly \$3 a woman.

The Italian investigation showed that the payment of one-half wages for thirty days would probably amount to three-tenths of one per cent of the payroll, and consequently on that basis the payment of full wages for ten weeks, or sixty working days, would foot up four times as much, or about 1.2 per cent of the payroll. Allowing for the discrepancies in ages, assumed birth-rates and expense margins in the Italian and American computations, the apparent cost showings of 1.2 per cent and 96/100 of one per cent of the working women's payroll are therefore in substantial accord. It would seem to be reasonably safe to assume that the maintenance of a maternity fund for factory-working women in the United States, and the payment of even ten weeks' full wages to each of them bearing child would not annually exceed one per cent of their payroll. If only half-wages, or full-wages for only five weeks, were to be paid, of course the cost would be cut in two, and reduced to less than one-half of one per cent of the payroll.

I believe that this showing brings the idea of a maternity fund for American factory-working women out of the clouds of uncertainty, and close to the ground of commercial and economic practicability. Apparently the annual per capita cost of such a fund would not exceed 6 cents a week, or one cent a working day, for each female worker of child-bearing age employed in manufacturing or mechanical pursuits. If the employer were to provide half of the cost, a deduction of 3 cents a week, or preferably 13 cents once a month, from each woman's pay envelope would furnish the entire cost of the fund—for the time being leaving out of consideration the possibility of any contribution, direct or

indirect, to the fund on the part of the State. And it must not be forgotten that the Italian Government has contracted to meet one-fourth of the entire cost of its National Maternity Fund, or that so sound an economist as Prof. Jevons more than thirty years ago arrived at the conclusion that "in the long run it would pay for the State to employ them (the working mothers) as nurses of their own children." However, the time for the discussion of this advanced phase of the child-bearing factory-women problem has not yet arrived, and the question of the immediate present is, cannot the imperatively-needed maternity fund be established, one way or another, in the near future.

Is not some such plan entirely practicable, and would not the great benefit which it would mean, not only for the working women and their offspring but for the future population of the country, make it well worth the cost, and well worth the trying? Personally, I most emphatically believe that the answer to each of these questions is YES, and that until some such method of providing a maternity fund has been worked out no law prohibiting the employment of child-bearing women in factories during the period immediately following, or preceding, their confinement will be practicable in this country. The law now on the statute-books of Massachusetts and New York in my judgment merely amounts to an official registration of a most important declaration of faith in the necessity for some such law; when some practicable means of compensating the working mothers during the period of enforced rest has been devised, and put in force by legislation or otherwise, such a law will be effective, and not until then as I see it. The painful natural law—or unwritten law of modern social and economic conditions—of "work or starve," applicable in so many cases of factory-working women, so foreordained.

NEW YORK, *May 6*, 1912.

II

Conditions in Canneries

MEMORANDUM OF THE NEW YORK STATE CANNERS' ASSOCIATION.

1. *Extent of Business:*

There are about 100 Canning Factories in the State, having an invested capital of about \$10,000,000, using the products of some 200,000 acres of lands. The employees number from 35,000 to 40,000 people.

2. *Location of Factories:*

With few exceptions, the canneries are located in rural communities where there is a good atmosphere and the surroundings are conducive to healthfulness.

3. *Character of Employment:*

The season extends from about June 15th to October 15th, where the factory processes peas, beans and corn, with a slack period after the processing of the pea crop, and in the ordinary operation of a factory there is quite a variation in the work. First, the three crops present three different varieties of work for the help, and second, the help is frequently shifted from one class of work to another on the same crop, so that it can be safely said that there are no long periods of monotonous work for the employees and frequently on a single day one person will work on two, three or even four different kinds of work.

The factories are usually near small villages or hamlets and the employee can reach home for the mid-day meal by a two, three or five minutes' walk, presenting a situation quite different from that found in the ordinary manufacturing plant.

4. *Regulation of size of crop and time of maturity:*

It is a physical impossibility to so plant vegetables or regulate the ripening of fruits and vegetables as to avoid certain rush periods. Nature alone dictates the time when products are ready for canning and when they are ready they must be canned, otherwise there follows in a few hours a depreciation of quality and

in a very short time a loss of the crop. This necessity for prompt canning is well known to the canner and has been repeatedly confirmed by bacteriologists. Under some weather conditions, gathered vegetables lose fully 50% of their saccharine matter in a few hours time.

The usual canning season for peas covers a period of about four to six weeks and the corn season averages about the same, but it is nothing unusual to have the bulk of either of these crops mature within a period of two weeks, or the early planting may be largely crowded into a period of one week and the late planting into another week, with a short slack period between. It all depends upon the condition of the weather.

Nor is it possible to meet the situation by any reasonable limitation of acreage.

A. A small acreage with a large crop may mature so as to produce an exceedingly embarrassing rush period, whereas a large acreage with a small crop may mature without any special rush period.

B. The period for the use of the establishment is so short and the investment so large that a reasonable acreage is absolutely necessary from a business standpoint, and further the suggestion that the surplus goods be wasted in rush periods is made without knowledge of the situation and the effect of such course. The canner must, first, process sufficient goods to meet his operating expenses, maintenance charges, depreciation of plant which is very heavy, his obligation for crops contracted for, and last, his profits. It is the very last of the crop from which he gets his profits. Assuming that a fair profit or a profit for a good year is 10%, now, by a loss of 10% to 15% of the product in the rush periods, his entire profit for the season would be wiped out, and the matter resolves itself to the simple proposition that there is an absolute necessity on the part of the canner to save his crops and to work such hours as may be necessary in rush periods to accomplish that result, otherwise he must go out of business.

There may be an occasional situation where the canner plants a larger acreage than his factory is able to care for on an average season, but this would be an exceptional situation, for it is

distinctly to the disadvantage of the canner to be unable to handle his goods promptly. It is only by prompt handling that he can obtain a good percentage of high grade goods. The profit is realized almost entirely from the high grade goods; second class goods are put up to save the loss of crops and are sold usually at less than cost.

5. *Undesirability of long hours:*

It is distinctly to the disadvantage of the canner to be compelled as he frequently is, to work for long successive hours; first, in operating for long hours, there is always more or less depreciation in the quality of the goods by holding the product for a considerable time before processing. Second, there is a decided depreciation in the effectiveness of the labor employed, and, for the overtime, as a rule the canner does not realize to exceed 60 to 70 per cent. efficiency on the part of his employees and this depreciation of efficiency increases always in proportion to the length of the hours of employment, not only for the day of the employment but has its effect upon the efficiency of the employee to a greater or less extent on the following day. Every canner, therefore, aims and designs to avoid rush periods and long hours.

6. *Extra Shift:*

In a majority of the canneries of the State, during the average season the average daily hours of labor for the employees is less than 9 hours per day. An examination of the records of a large number of these canneries discloses the fact that in a great majority of them the average number of hours per day for the season is less than 8½ hours and in very few of them will the hours exceed an average of nine hours per day. Canning is done in the busiest part of the year and every laborer at that season of the year insists upon and is entitled to what is equivalent to steady employment for about 9 hours per day. The canner, therefore, can only hope to hold among his employees such number as he can furnish with an average employment of about 9 hours per day for the season. This being so, it follows that it would be entirely impossible to obtain an extra shift of help for a few days in the rush periods, and even where the cannery

is located in a city, which is unusual, and help could in some cases be obtained by increasing the wage, this is not considered practicable for the reason, first, it is too doubtful a proposition for the canner to rely upon being able to hire an extra shift for such very uncertain and very short rush periods and, second, the help thus employed would be inexperienced and unable to handle the work, and especially is this true in connection with the employees of the factory proper; and third, the introduction of a higher wage to emergency helpers or outsiders, so to speak, would immediately demoralize the regular working force. Again, it has been found, in actual experience, impossible to obtain help for an extra shift on account of the fact that at many of the factories such help are not to be found or had and it would of course be impracticable to import for a short rush period.

7. *Exemptions for cannery in other States:*

There are twelve States in which canning of perishable products is carried on to such extent that the labor problem becomes of such moment as to receive consideration. Of these the following nine States have established general exemptions for the canner:

| | |
|-----------|------------|
| Delaware | California |
| Ohio | Maine |
| Michigan | Indiana |
| Maryland | New Jersey |
| New York. | |

We quote from the provisions of the Labor Law of some of these States, the exemption, as follows:

California.—"Provided, however, that the provisions of this section in relation to the hours of employment shall not apply to nor affect the harvesting, curing, canning or drying of any variety of perishable fruit or vegetables."

Ohio.—"Provided, however, that no restriction as to the hours of labor shall apply to canneries or establishments engaged in preparing for use perishable goods."

Maine.—"Nothing in this section shall apply to any manufacturing establishment or business, the materials and products of

which are perishable and require immediate labor thereon, to prevent decay thereof or damage thereto."

Michigan.—In the employment of females and minors the Michigan statute contains the following exception: "Provided, however, that the provisions of this section in relation to the hours of employment shall not apply nor affect any person engaged in preserving perishable goods in fruit and vegetable canning establishments."

Indiana.—"Section 1. That no child under the age of fourteen (14) years shall be employed or permitted to work in any gainful occupation other than farm work or domestic service, excepting that any child between the ages of twelve (12) years and fourteen (14) years may be employed or permitted to work in the business of preserving and canning of fruits and vegetables from the first day of June to the first day of October of each year."

Maryland.—"Provided that the provisions of this section shall not apply to the canning or preserving or the preparation for canning or preserving of perishable fruits and vegetables."

Delaware.—No limitation as to women and minors over 16.

It will be noticed from the above that all but three of the "Canning States" have established exemptions for the canner. This is very significant as indicating the judgment of the legislators of these various States on this problem. Of the States where exemptions have not been thus far given, in one, Iowa, the industry is of very limited proportions and confined to one crop—corn—and no special attention as far as we have been able to learn has been given to the enforcement of the Labor Law as applied to the canner, except as to minors, and in this particular a special exemption for shed work has been adopted, and is hereinafter quoted. In the other two, Illinois and Wisconsin, the business is limited largely to one product in each State, viz.: In Wisconsin peas, and in Illinois corn, and we believe these two States must eventually establish exemptions, besides it should be borne in mind that in Illinois no effort has been made to enforce the Labor Law as to canneries, except the provision excluding children from the factories proper, and in Wisconsin the pea

packing season is some eight weeks long, and much more regular than in New York State. And in this particular it should be stated that in New York the industry is very diversified, including peas, beans, tomatoes, corn and apples, besides the small fruits, and the State is first in of packing of high-grade goods.

8. *Possible Limitations:*

First, it is an impossibility for the canner to determine the number of hours he will be called upon to operate his factory on any given day, in order to prevent the waste of crops or the depreciation of the quality of the goods. In any given year one canner may be enabled because of the regularity of the maturity of his crops, especially if the crop is less than 75% of the average, to operate his factory within a 60-hour limitation, while another canner the same season, who is harvesting a crop of not to exceed 75% of the average, may have such a rush period that he cannot operate his factory within a limitation of 70 or even 80 hours, if he saves the product. He cannot tell whether the crop will be small, average or large, and on this account he buys his supplies, such as cans, boxes, etc., on a sliding scale basis, with the right to increase or decrease. Assume, for illustration, that the canner is in the midst of the busiest part of the pea packing season, and that on Monday and Tuesday it rains so as to prevent the harvesting of crops, and that the weather is conducive, as it frequently is, to the rapid maturity of the peas. He is therefore behind Sunday, Monday and Tuesday, three idle days, and he must either make up at least the two rainy days or abandon the harvesting and processing of part of his crop. The only possible way of making up the lost time is by overtime, and as soon as he resorts to this means, of necessity he is operating his factory long hours. This is a situation that frequently arises and cannot be avoided or remedied by any act on the part of the canner nor by any legislation.

It frequently happens that the factory is shut down for a quarter or half day by reason of breaks in the machinery, and this again produces a crowding period. To compensate for these long delays it is a fact well known to the canner that a considerable time is invariably lost during the course of each day because of breakdowns or a change from one crop to another or from one

grade of goods to another, and during these periods of breakdowns, for one cause or another, the employees have rest periods.

The pea crop of the past season did not exceed 65% of an average crop, but because of the very bad weather conditions the rush period was bad and required excessive hours, thus illustrating the fact that no reasonable installation of machinery can be relied upon to meet the varying emergencies. At one factory during the past year ten special machines were installed at an expense of several thousand dollars and with the hope of handling the rush business more easily, but the machines failed to meet the expectation, and a very bad condition as to hours resulted. In another case the water supply that had been in successful operation for several seasons gave out, causing a delay of some two and one-half or three days, and produced unavoidably a bad congestion. The canner, therefore, is, from his experience in this matter, afraid of any limitation because he knows that, extending over a period of four or five years, there are sure to be days when the hours, of necessity, must be extremely long, and even if he should suggest a limitation of 84 hours, yet, it is the uniform judgment of the canners of the State that there will be times in the experience of the most prudent and conservative when the limitation will of necessity be exceeded, or a loss of crops entailed.

9. *Shed Work:*

The work in the sheds is distinctly agricultural in its nature and for that reason the canner urges that it should be left upon the same basis as employment in agricultural pursuits. In a recent annual report of the Labor Department of the State of New York to the Legislature, we find in speaking of canneries and the work in the shed: "So far as a fixed schedule of hours is concerned there is practically no such thing in shed work. Great irregularity in hours worked prevails throughout canning establishments and the irregularity is greatest in the sheds. This is due to the irregularity in the delivery of raw material handled in the sheds. No attempt at any fixed schedule is made, therefore, but workers come and go, are busy or idle, according as the materials come in from the fields or farms. * * * So far as supervision to compel steady work when materials are on hand is concerned the observation and inquiry of the Department agents

failed to discover any such pressure on the part of the employer in the case of the children. * * * The children were permitted to come and go as they pleased in the sheds, so far as the management was concerned."

Sheds where machinery is operated should be treated as part of the factory. Sheds where machinery is not operated should not be so treated. The crops are grown in the fields and one body of employees labor in the fields picking beans or pulling corn (gathering the ears from the stalks). Now, these beans or corn, as the case may be, are taken to the shed and there the beans are snipped or the corn husked. A good test of the character of this labor from the standpoint of the laborer is found in the fact that universally laborers prefer the shed work to the field work, because it is not so hard and as a rule more agreeable. The canner, therefore, naturally inquires why should one rule obtain as to the picking of beans in the field and another rule as to the snipping of beans near the field or near the factory in a shed, as the sheds are concededly open structures with plenty of light and wholesome air and are located in rural communities, where none of the congested conditions of the city are found.

The objection to children under 12 or 14 years of age working in the sheds arises largely because of the tendency of the Sicilian or Italian mother to compel the children to work, and on this subject we suggest: First, it is questionable how far effective legislation can be passed, having for its purpose the correction of the habits and tendencies of the Italian, Polish or Sicilian mother. It will be found that the severe manner of the mother rules the house and family in largely the same manner as she controls the family in the shed or field; second, if we take a concrete illustration, we find in one case there are some 50 Sicilian mothers living in close proximity to a canning factory. These mothers are from poor homes where there are large families to be provided for. During the two or three months in the Summer when the children are out of school she takes her family, including the infant child, to the shed, the younger child being in a baby carriage. We can assume a family of three or four, the oldest about 11. Now, the proposed law by which we are to eliminate these children from the shed is going to accomplish one of two results. First, the

mother will be deprived of the privilege of earning anything during the Summer months and must remain home and care for her family, or the little ones must be left at home alone. In another case we will find an Italian mother widowed with two children, one 10 and the other 12. She is working with the children in the shed and she feels that the children under her direct supervision are safer there than either at home or upon the streets. The proposed law will eliminate both mother and children from the possibility of working in the sheds and she must go to the fields, exposed to the heat of the sun and the varying conditions of the weather, and perform work much more trying in its nature both upon children and mother. Third, it is suggested that a few years of contact on the part of these foreigners with Americans and American habits and customs has and will work a marvelous change in the habits of these foreigners, and they naturally rapidly drop into American ways and customs, both as to the schooling and the treatment of their children. And it certainly is questionable whether a law excluding children under 12 from all work in these sheds would not in result do more harm than good in the general uplift of these people.

It is interesting in this particular to note that in the State of Iowa we find as part of the Child Labor Law: "But the provisions of this section shall not apply to persons employed in husking sheds or other places connected with canning factories where vegetables or grain are prepared for canning and in which no machinery is operated."

In the State of Delaware there is an entire exemption of the shed work from the Child Labor Act.

In the Province of Ontario, Canada, children without respect to age are permitted to be employed during the months of June, July, August, September and October in canning sheds, where no machinery is in operation. We quote from the provision permitting this work in Ontario, the following:

"Boys and girls between the ages of twelve and fourteen years; and when employed solely out of doors, children of under twelve years of age may, notwithstanding anything contained in this Act, be employed during the months of June, July, August, September and October in any year in such gathering in and other

preparation of fruits or vegetables for canning or desiccating purposes as may be required to be done prior to the operation of cooking or other process of that nature requisite in connection with the canning or desiccating of fruits or vegetables. The place, room or apartment in which such boys or girls may be so employed, shall be separate from any other wherein the cooking or other process aforesaid, or the canning or desiccating of said fruits or vegetables is carried on."

A law prohibiting children under 14 working in the sheds will simply have the effect to encourage women and children to go from Western New York into Ontario, Canada, where there are upwards of 40 factories in operation and in need of help each Summer, and transportation from Buffalo to Ontario is just as ready and economical as to points in Western New York.

10. *School Attendance:*

The Compulsory Education Law makes provision for the attendance upon public schools of all children of school age and no additional legislation on that line would seem necessary. It also appears that the canning season does not open until after the close of the public schools, June 15th, and that after the opening of the public schools in September the children are not employed in the sheds, excepting in a few instances where the canner has not installed husking machines, and as the husking machine has been or is being introduced into all the corn processing factories, the situation takes care of itself, for the reason that there will be no further need of the employment of minors in husking corn and there will be nothing to interfere with the enforcement of the educational law, excepting possibly in cases where the parents take their children from the city into the country and do not return to the city until after the opening of the schools. But the excluding of children from working in peas and beans during June, July and August will not send the parents back to their city homes with their children in September. The parent will still be engaged in the cannery and the children will be, to a greater or less extent during September, held out of school unless the Compulsory Education Law be so amended as to be made effective in this particular. In other words, no law aimed at the shed work will in any degree relieve the public school attendance or

irregularity in attendance, as the shed work in peas and beans during June, July and August does not interfere with the public schools, and the shed work in corn has been substantially dispensed with by the introduction of the husking machine.

We have filed with the Committee a number of certificates from physicians in practice among the families whose children are employed in the shed work, and we are submitting herewith some additional certificates and also a brief summary of statements heretofore filed with the Senate Committee on Labor and Industries from school superintendents, truant officers, superintendents of charities, city missionaries and health officers, showing that this work in the sheds has never been found prejudicial to the health of the children, and that it affords an easy and ready means for the children in poor families earning in vacation time money that will be helpful in the purchasing of clothing, school books, etc.

11. *Young Children Undesirable in Factory Sheds:*

Children under 8 or 10 years of age are undesirable in the cannery shed as employees, for the reason that where they attempt to work the canner finds that they waste an amount of material at least equal to the benefit that the canner receives from their labor, but the children have been tolerated in the sheds in order that the mothers and older members of the families might not be excluded from work by the exclusion of the children. During the present season the cannery as a whole have made an effort to exclude all children under 10 years of age from the factory sheds, and there is no question but they have to a considerable extent been able to bring about this result, although there have been many exceptions, due to the fact that in some cases the exclusion of a child under 10 would take from the sheds one, in other cases two and even three older members of the family, as the family would transfer to some other line of employment rather than have one member remain home with a child under 10.

We believe also that during the year 1912 there has been shown a decided improvement in the conditions pertaining to this shed work, as the State Cannery Association, through a committee having the matter in charge, communicated with every member of the association, urging the exercise of the greatest degree of

care in the matter of this child labor in the sheds, and we fear that much of the data presented to your Commission will be data gathered previous to the year 1912, and gathered at a time when the work in the shed was on quite a different basis.

We invite the attention of the Commission to memoranda entitled "Recommendations," submitted herewith, being a communication sent out by a committee of the State Cannery Association early the past season, with a view to procuring a closer observance of the law and producing better conditions in the factory and sheds.

We also call the Commission's attention to the data submitted herewith from The Burt Olney Canning Company, the plant located at Albion, New York.

It may also be of interest to the Commission to learn that during the past five years there has been a decrease of eight in the number of factories in the State of New York, while in some of the other canned goods States, so called, there has been a substantial increase, and last year there were fifty new factories put in operation in one competing State and eight new canning factories in another competing State. We simply call attention to these specific items as illustrating the general condition obtaining and showing that there really is a close competition between the canned goods industry of this State and that of other States, and that while the cannery of other States are operating under general exemptions from the Labor Law provisions, it will produce a harsh, if not destructive, competition to compel the New York cannery to attempt to operate under strict regulation as to the hours of employment.

The New York State cannery invite a closer and better inspection, and join in the suggestion that a separate bureau should be established, having this inspection in charge, believing that the establishment of such bureau, with a competent person in charge and competent inspectors to do the work, will accomplish much good, not only for the people of the State, but also for the cannery themselves.

12. *Suggestions as to Legislation:*

First.— We suggest the establishment of a Bureau of Inspection, as mentioned above.

Second.— We disapprove of the proposition to make the shed, so called, a part of the factory, as the buildings are, as a rule, entirely separate from the factory, and are of a character entirely different from the ordinary factory. Where, of course, there is found active machinery, there is no question but that such shed is now under the Factory Law.

Third.— We believe the desired result can be obtained as to the work in the sheds by an amendment prohibiting children under 10 years of age from doing any work in the sheds, and making the parent of the child, as well as the employer, responsible for the violation of this provision.

Fourth.— A further provision should be made prohibiting children between the ages of 10 and 14 from working in the sheds, unless a certificate is obtained by the person desiring employment, in all respects similar to the certificate now provided for for children between 14 and 16 years. This provision will exclude any and all children between 10 and 14, who are not in physical condition suitable for this employment.

Fifth.— There should be a restriction upon the number of hours of employment for children between the ages of 10 and 14 in the shed to eight hours per day, because of the nature of the employment. The eight hours should be permitted between 6 o'clock A. M. and 7 o'clock P. M., as occasion may require.

Sixth.— As to the employment of women in the factory proper, we suggest that the present statute be given a fair trial before restrictive amendments be adopted. The statute is the same as that found in substantially all the "Canning States," and under these circumstances we feel that the Legislature can afford to act conservatively and in harmony with other States.

JOHN F. CONNOR,

Attorney for New York State Cannery Association.

MT. MORRIS, NEW YORK.

III

The Reorganization of the Labor Department

MEMORANDUM BY THE NEW YORK ASSOCIATION FOR LABOR
LEGISLATION.

December 2nd, 1912.

HON. ROBERT F. WAGNER, *Chairman*
Factory Investigating Commission,
New York:

DEAR SIR:—

The tentative bills of your Commission relating to the organization of the Department of Labor and the creation of an Advisory Board have received the careful consideration of this Committee. We are in hearty accord with your Commission on the general proposal to increase the trained and expert staff of the department and to place within the department authority to make regulations and establish standards applicable to specific conditions as they may be brought under review. Your proposal, not yet drafted, in amendment of the tentative bill, whereby all inspection work of the department shall be centralized under one head, also seems to us an excellent plan and one promising to result in greater uniformity and efficiency of work.

The broad subject of organization of the Department of Labor, whether it is wise to place at the head thereof a commission or a single commissioner with authority, prestige and salary beyond that of the present commissioner, is a question upon which there may well be difference of opinion among others as in fact, there is among ourselves. The point upon which all will agree, is that at the head of the Department of Labor there must be such vigor, enthusiasm, wisdom and experience that the Department's staff will enforce the labor law with the maximum of efficiency and minimum of friction.

It is of course obvious, that whatever the form of organization, two points are essential. First, authority must be so centralized and fixed, that responsibility for the execution of the labor law may not be avoided or shifted; and second, appointment,

tenure and promotion within the Department must be for ability alone. Without these two safeguards that improvement in administration of the labor law, which all regard as necessary, will be impossible.

While careful and repeated consideration of various methods for insuring the centralization of responsibility and the most effective deliberation and action in relation to such rules, regulations and standards as may properly be left to the Department for formulation has left us divided upon the basis matter of individual or board control of the Department of Labor, the Executive Committee of the New York Association for Labor Legislation make the following recommendations — unanimously, except for Mr. Bates and Mr. Mitchell who are absent from the city and Commissioner Williams, who no doubt will prefer to make his recommendations to you individually and in person.

If there shall continue to be a Commissioner of Labor, the salary of such commissioner should be large enough to attract to the position those who have the high ability and broad outlook for which this responsible office calls. In fixing the exact amount, consideration must, on the other hand, be given to other salaries in State and Federal employ and to the fact that public service carrying with it public honor and the opportunity to serve the State, need not and generally should not be paid for on the same basis as service in private employment. We think that the \$15,000 tentatively suggested in the bill before us, is much too high and that the effect of such compensation might in time be to make the position of head of the Department of Labor one of the most eagerly sought for political rewards in the State service. Such salary is not needed to attract the best ability and probably would tend to the practice of appointment of figureheads and dependence upon permanent subordinates for the actual direction of Department affairs. We suggest a salary of not less than \$7,500 and not more than \$10,000, with necessary traveling expenses.

Among the many well considered recommendations of your Commission, one of the most excellent is the proposal for an Advisory Board within the Department to draw up rules and regulations and to establish standards. This is in keeping with

the general trend in this country and abroad where more and more legislative bodies are leaving to responsible boards such detailed regulations as experience has shown cannot effectively be worked out by Legislatures themselves.

The particular form of organization tentatively proposed by your Commission we would, however, amend in some particulars. As the chief function of the Advisory Board will be to investigate, to hear evidence and after deliberation thereon, to promulgate rules, regulations and standards, it is questionable whether the best results can be expected from a board as large as seven or from one paid on a *per diem* basis. But whatever the number of members and whether paid by the day or by the year, we look upon it as most highly desirable that this Board shall be so constituted and shall be given such authority that the members thereof shall appreciate the grave responsibility of exercising powers over important industrial matters, as a rule reserved to elected representatives of the people. We would have the Commissioner of Labor, *ex officio* the Chairman of the Board — since his is to be the final responsibility for the work of the whole Department of Labor as well as for the execution of all the duties placed upon it, but we would not carry the Commissioner's influence with the Board so far as to give him veto power over its actions.

One of the principal functions of such Advisory Board would be to so educate the public and to secure such co-operation of employers and workers, that the labor law might be the more willingly lived up to. It would also frequently be called upon to formulate rules involving a high degree of technical knowledge of special industries or of special subjects. The Board, accordingly, should be given express authority to create, as deemed desirable by it, volunteer special boards, composed of employers, employed and others having exceptional knowledge or interest in particular industries; at other times the Advisory Board should be enabled to call to its aid, boards of the best training and skill obtainable in particular technical matters, such as ventilation, lead poisoning, etc., affecting large groups of industries. By statute the Advisory Board should be authorized to call on the Department of Labor for such investigators

from the regular Department staff or from outside as might be required by the Board itself or by any of the supplementary special boards set up by it. If, in your final recommendations to the Legislature, it shall be decided to include this excellent feature of an Advisory Board, and more especially, if the suggestions herein made for adding somewhat to the power and authority of such board are incorporated in your bill, it would seem that some of your other bills, as No. 18, in relation to the protection of employees operating machinery, etc.; No. 20, in relation to the prohibited employment of children should be amended by omitting the present specific authorization therein to prescribe rules and should be changed so as to leave for promulgation by the Advisory Board rules and standards which are now set forth in some detail in those bills.

To sum up, the Advisory Board should be made the final authority and the commanding force within the Department of Labor and in all matters where the establishment of standards and regulations is by statute made discretionary. But the Commissioner of Labor is to be the responsible executive and administrative head of the Department. Violations of the provisions of the labor law and of the orders of the Advisory Board must be watched for by his inspectors. The enforcement of the code of labor regulations as defined by the Legislature and the Advisory Board, will be solely in his hands.

In general commentary of these proposed bills in their present tentative form, we do not believe it would be wise to create four deputy commissionerships. Further, we believe that some such title as "Chief Inspector" is to be preferred to "Deputy Commissioner," as it is important that the Commissioner should be in name, as well as in fact, the sole and responsible administrative head of the Department, the one whom the public may hold responsible for undivided and strict attention to the execution of the labor law. The counsel of the Department to whom it is proposed to give added responsibility and increased salary should, we think, be prohibited by a specific clause to that effect in the law, from engaging in the private practice of his profession.

We endorse as a much needed step, the centralization of all routine inspection in one Bureau of Inspection with divisions of

inspection—Factory, Mercantile, Tenement Manufacture. We suggest, however, that the Division of Tunnels, Mines and Quarries be dropped and that this work of a technical character be given over to the Division of Industrial Hygiene. On the other hand, it might very well be advisable to create a Division of Buildings and Public Works. In this latter connection we call attention to the last report of Commissioner Williams in which the inadequacy of the present law in relation to public works is referred to and in which is set forth the very large number of accidents on buildings in the course of construction. We would strongly urge, that the Commissioner be given within his discretion latitude for transfer from one division to another, subject always to the Civil Service law.

It seems to us to be in the interest of centralized authority to have between the executive head of the department and the inspectorial force as few intermediaries as is possible, due consideration being given to the fact that efficient inspection undoubtedly is to be had as a rule, only through close supervision and single direction. We question whether the organization tentatively proposed will not have about it too many officials who may not themselves be sufficiently active in productive enterprise. In this connection, it is to be remembered again that the Commissioner should be given certain latitude for the internal organization of the Department for whose efficiency he is to be responsible before the public.

As to the other bureaus of the Department not at present covered by your proposals, we have only brief comment to add. The Bureau of Statistics should, in our opinion, be broadened out into a Bureau of Statistics and Information with added force and by law expressly charged with such duties of publication as by custom it has long performed. Thus its appropriation and force for needed statistical enquiries would not be turned aside to other work as readily as in the past. As to the Bureau of Mediation and Award, we shall be glad to confer with you in relation to its difficult and important duties whenever this may be agreeable to you.

In conclusion, we regard it as a serious mistake in principle to expressly limit the application of the Civil Service law to

“*subordinate* officers, assistants and employees.” Just as we believe that the tentative amendment of sections 180-181 of the labor law in relation to a chief mercantile inspector and not more than twenty-five mercantile inspectors, continues a wrong practice in permitting to the Commissioner of Labor appointment and removal at pleasure, so we believe that the many heads of bureaus and divisions to be created by these bills under consideration should be expressly brought within the safeguards of the Civil Service Law. In this connection it may not be inappropriate to recall the fact that in spite of the recommendations of the Commission which proposed the appointment of eight supervising inspectors, such positions by the law subsequently enacted were not expressly limited to the classified civil service law and that, in consequence, only four of the said eight supervising inspectors after much public agitation and much delay and, at the last, in a most unfortunate manner, were appointed through Civil Service examination, while the other four were appointed without examination, their positions only thereafter being brought within the classified service. It is further a well known fact, that one of the most efficient bureaus within the present labor department is the Bureau of Statistics which is almost wholly protected by the civil service law, even to the Chief of the Bureau, himself, a most efficient public servant and one having important and diversified duties to perform.

We would, therefore, urge the members of your Commission to exercise their great influence to safeguard appointment and promotion within the labor department. This most important public service, upon whose honesty and efficiency in a very real sense depend the safety and welfare of great numbers of our people, calls for a trained force and one in the appointment and promotion of which favoritism shall play no part. Service in the Department of Labor must be an honorable and permanent career where proved ability alone should be ground for continued employment and advancement. The Department must be kept clear of politics and even of the opportunity for favoritism, if it is to become the recognized strong arm of government, fearlessly, and in fact protecting the immense industrial population of this

State from death and injury from fire, accident, disease, excessive hours and premature employment.

Respectfully submitted,

SAMUEL McCUNE LINDSAY,
HENRY R. SEAGER,
VLADIMIR G. SIMKHOVITCH,
LEO ARNSTEIN,
JOHN A. FITCH,
PAULINE GOLDMARK,
PAUL KENNADAY,
JOHN MARTIN,
I. M. RUBINOW,
V. EVERIT MACY,
A. F. WEBER,

*Executive Committee of the New York
Association for Labor Legislation.*

MEMORANDUM SUBMITTED BY MR. PAUL KENNADAY.

PAUL KENNADAY, 780 PARK AVENUE,
NEW YORK.

December 2nd, 1912.

HON. ROBERT F. WAGNER, *Chairman Factory Investigating
Commission, New York:*

DEAR SIR:—

Your Commission has gone so far toward providing for this State a body of labor law at last commensurate with the needs of this premier industrial state, that the methods proposed for the administration of those laws are at this time matters of the first consequence.

You have recognized as have all students of labor legislation that adequate regulation of industry is not to be had alone through acts written down in statute books by legislatures. And although legislatures move slowly in this direction and the courts more carefully still, holding strictly to the theory that powers delegated to the people's representatives, may not by such representatives be delegated on to others, you have observed that in practice it

has come about that responsible boards nominated by the Chief Executive of the State and confirmed by elected representatives of the people, do in fact to-day exercise powers which are both quasi legislative and quasi judicial. You have accordingly most wisely provided for an Advisory Board within the Department of Labor to draw up rules and regulations and to establish standards.

But to me it seems that most efficient administration and execution of the labor law is to be had only through substituting a Commission for a Commissioner at the head of the Department of Labor and for the following reasons is not to be expected from your present proposals for a Commissioner of Labor and an Advisory Board of seven:

1. The duties of the Advisory Board will be many and heavy. Before it will appear great financial corporations and associations of employers exercising influence in many ways and pleading in no uncertain voice for exemption from proposed regulations. Matters of vital moment to labor must be decided. The Board which is to judge between these interests, before which will be transferred many of the struggles heretofore carried on before committees of the Legislature, soon will become the center of attack within the Department and soon will be elevated in the popular mind to a position of commanding importance. It is not unlikely that the Legislature itself will in no small degree defer to the judgment of the Board on labor questions and will receive from it recommendations for remedial legislation.

2. It will not do to subordinate the power exercising these functions to any executive power within the Department, nor to attempt to make the two of equal importance. At the head must be either one board or one commissioner, exercising undivided responsibility and accountable therefor. There does not appear to be any satisfactory way of separating responsibility for administration, from responsibility for execution. Division inevitably leads to friction and just such shifting of responsibility as was disclosed to you in your study of the causes leading up to the Asch Building fire.

3. That body which is to be given authority to draw up rules, regulations and standards must clearly have at its command and

under its immediate supervision and continued control, a body of trained investigators. But it would seem to promise, on the other hand, inefficiency if the executive arm has no experts engaged in carrying out the recommendations which the experts of the Advisory Board have helped to establish.

4. A Board of seven is too big for deliberation and for each member to feel a high degree of personal responsibility. A Board, composed, as proposed, with several experts among its members, will depend upon its expert member as particular matters falling within his special knowledge come up for review and will not deliberate and consult. A board paid on a per diem basis, as proposed, may prove wasteful — as witness *Condemnation Proceedings*. It is not at all likely that those best qualified to occupy these highly important positions will be able to accept appointment at any such scale of compensation as that proposed. Far from being a Board commanding general confidence and respect, it is apt to be composed of men of mediocre ability and too much leisure or of distinguished ability with too little time to devote to their Board duties.

5. It is very generally recognized that even if an Advisory Board were set up within the Department of Labor, still that clear mastery of technical subjects necessary for the formulation of rules and standards, could not be obtained except through the medium of still other boards to advise the Advisory Board to the Commissioner. In these cases,— and there will be many of them, — the Advisory Board becomes clearly supernumerary.

6. The arbitration and conciliation of labor disputes is a matter of the very first importance falling within the province of the Department of Labor. No employees of the Department can have that standing in the community necessary to the creation of the proper degree of confidence in their impartiality and ability. No single Commissioner can devote to these often protracted disputes the time required. A Commission entrusted with the execution of the labor laws of the State and granted the unusual discretionary powers proposed to the Advisory Board, would be just such a body as to command that public confidence which is essential to a settlement of such industrial disputes as are susceptible of settlement.

7. The very work in which your Commission has been so industriously engaged is cogent argument in favor of a Commission rather than a Commissioner. The work and the questions which have been opening up before you, as you have gone about the State since your organization, I believe have brought the conviction that the complexities and extent of industrial problems demand not investigation and recommendation by a legislative committee, now and again appointed in response to some loud public protest, but rather a commission which shall be permanent in character, and which in the course of time shall gather to itself just such knowledge and experience as has your Commission. And further, as legislative commissions are subject to the vicissitudes of parties and as legislators, no matter how keen their interest in their Commission work, have many other important duties not to be neglected, it is not possible to secure through these special commissions, that undivided, trained and continuing service which is called for in order most efficiently to protect the great industrial population of the State.

8. In view of the political pressure to which as a matter of common knowledge the Commissioner of Labor is subjected, a Commission of three members would be more effective than a single commissioner. In coming to this opinion, I have not been unmindful of the dangers of inefficiency, corruption, secret society affiliation and political partisanship to which the interests of the people may be exposed through even a commission such as I advocate. On the other hand, such dangers are present in at least equal degree under any other form of organization which can be proposed, and in fact are not to be eliminated by statute, but rather through public opinion and the action of public officials responsible for their acts to the people.

Yours very truly,

PAUL KENNADAY.

IV

Memorandum on Behalf of New York Retail Bakers' Association

This memorandum is submitted on behalf of New York Retail Bakers' Association, a membership corporation organized and existing under the Laws of the State of New York, with a membership of fifty bakers, all of whom are engaged in the baking business as proprietors with establishments in which a capital is employed of between \$5,000 and \$50,000. The product of these establishments is inclusive of every kind of baked goods except crackers.

The memorandum is specifically addressed to Proposed Bill No. 26, issued as embodying recommendations submitted to the New York State Factory Commission.

I.

SANITATION.

So far as this Proposed Bill emphasizes sanitation in bakeries, the New York Retail Bakers' Association desires at the outset to express its full and hearty concurrence. In fact, this Association of its own volition as a matter of discipline among its members has maintained a system of inspection among its own bakeries, designed to continue the highest standard of cleanliness and wholesomeness in the manufacture of baked products.

It may be that some of the conclusions reported to this Commission by its investigators with reference to unsanitary conditions in bakeries are overdrawn, but whatever the conditions in other bakeries, whether as bad as reported by Dr. Price or not, the New York Retail Bakers' Association has striven and comes before this Commission to maintain the highest standard of sanitary conditions in its own bakeries under reasonable and properly administered inspection.

The only considerations which this Association under the heading of sanitation, desires to urge upon the Commission are considerations affecting the methods of inspection in order to enforce sanitation.

We urge:

A. Complete and centralized control in the regulation and inspection of bakeries and places where bakery products are sold throughout New York City, both as to sanitary conditions and as to structural and physical arrangements and equipment with a view to sanitation, in the hands of the Board of Health of New York City.

B. The granting of a Sanitary Certificate by this Local Board of Health to those bakeries or places where bakery products are sold when they have complied with the requirements of the local authority.

A.

Regulation.

1. Centralizing of Authority.

The centralizing of control over bakeries in the hands of the Local Board of Health would have these distinct merits:

a. It would obviate the clash and overlapping of authority which exists at the present time distributed between the State Department of Labor, the Local Board of Health, the Tenement House Department and the Bureau of Fire Prevention.

The authority reposing in each one of these separate departments to issue directions has resulted, in many cases, in contradictory orders impossible of obedience, thereby subjecting the baker to a penalty from one or the other authority, and certainly to the annoyance incident to an attempt to harmonize such orders.

It has, furthermore, subjected the baker to the necessity of dealing with an unnecessarily large number of inspectors who, in many cases, are quite individualistic in their demands, each inspector being quite arbitrary in the issuance of orders.

It has, furthermore, resulted in the making of repairs and improvements in compliance with one order only to be changed in order to comply with another order from a different source of authority.

And, in the confusion created in the mind of a perfectly well-intentioned baker as to what authority he should really follow, it has resulted that no authority was followed, thereby leaving the baker liable to a penalty from any one of them.

Reciprocally, from the point of view of the baker himself, the multiplicity of authority has left him without a direct and sure channel through which to fasten responsibility for the issuance of orders which, in many cases, being arbitrary or unwarranted by the facts should have been modified, or should be abrogated.

And, from the point of view of the regulating authority, it cannot have an adequate bureau of information as to changes made, or to be made, by any particular bakery, when the changes and improvements made in that particular bakery do not result exclusively from the exercise of that one authority.

b. The distribution and division of authority over bakeries as to sanitation has this further result, that it increases the expense to the people of the state of New York in maintaining both State and Local Departments, employing corps of inspectors at unnecessary expense, because of the duplication that results and, in consequence, deprives any one authority, *pro tanto*, of that amount of money which, placed in one channel, would furnish a more numerous and more efficient force of inspectors.

c. Finally, the inspection itself would be more efficient, because each inspector charged with the entire responsibility of ascertaining and reporting upon conditions as he finds them will and must necessarily be more faithful in discharge of his duties, when he cannot feel that another inspector from another source of authority may go over the same ground and possibly discover things which he himself may have overlooked.

In the second place, there would be no possibility of any one inspector from source of authority A shifting responsibility for careless work and oversight upon the shoulders of inspector from source of authority B.

Furthermore, this centralization of authority would obviate gaps which always exist where authority is divided, and with centralization of authority must necessarily come centralization of responsibility; only with centralization both of authority and of responsibility can regulation as to sanitation be fully efficient.

2. Advisory Board.

In connection with this centralized authority in the Local Board of Health, we favor the establishment of an Advisory

Board, the membership of which shall include a representative of the baking industry. This Board shall adopt and issue rules and regulations for cleanliness and sanitation in bakeries, but such rules, or any addition to such rules and regulations from time to time, should be so adopted only after a public hearing at which all parties interested may be heard.

The establishment of such rules and regulations will once for all fix the obligations of the baker to the community as to sanitation and cleanliness. He will know definitely what he is required to do, and he will also know when he has done it.

With an opportunity to be heard before the rules and regulations are adopted, the baker will have the satisfaction of feeling that he is not called upon to do something entirely arbitrary, but will be able to present considerations from his own practical viewpoint which should be taken into account in the formulation of these rules and regulations.

3. Scope of Regulation.

a. This regulation directed to cleanliness and sanitation to be effective must embrace not only the bakeshop where products are actually baked, but must include as well all places where these bakery products are sold.

Necessarily the attention of the baker to cleanliness in the bakeshop will be completely nullified if anywhere in the process of placing a given bakery product in the hands of the consumer there is inattention to cleanliness and a disregard of the rules and regulations which a baker must observe himself in the manufacture.

It may even be said that greater emphasis should be placed upon cleanliness in the sale and distribution of bakery products than in the bakeshop itself, because the application of intense heat in the baking process itself operates as a sterilizer, so that the harmfulness of lack of sanitation applies rather to the point when bakery products are sold and distributed.

Under existing conditions the Board of Health in this City rigidly inspects all places where milk is sold, and withholds a permit, the necessary *sine qua non*, unless its regulations for sanitation are complied with. Equally in the sale of bakery products there should also be such regulations by the Health authorities.

b. And this regulation must extend to the bakers' wagons or automobiles in which bakery products are distributed, and to the methods of distribution and delivery to the middleman and consumer. For example, bread delivered in bulk is left upon the front doorstep of the local grocer's store early in the morning many hours possibly before the grocer takes it into his place of business, being subject in the interim to the collection of dust and dirt and other applications.

B.

SANITARY CERTIFICATES.

In the proposed Bill No. 26, as circulated, there are provisions for the licensing of bakeries.

We advocate the issuance of sanitary certificates in place of licenses, as marking compliance by the baker with all the rules and regulations issued by the Local Board of Health as above provided.

This sanitary certificate will accomplish precisely the same purpose as a license. In the absence of such a certificate the baker may be forbidden to conduct his business after due notice. On the other hand, it better expresses the relationship which should exist between the baker's right to conduct his business and the police power of the state. The limits set upon the conduct of an individual's business which is not public, but private, should be limits prescribed only by considerations of the public health. The banker has an inalienable right to conduct his baking business as, when and how he pleases, subject only to a proper and reasonable exercise of the police power with a view to the public health. He does not need a license or grant of authority to conduct his business. The imposition of the police power upon his business is justified only to the extent that the public health demands it. And the compliance with this reasonable exercise of the police power may be sufficiently expressed by the issuance of such a Sanitary Certificate.

II.

PHYSICAL EXAMINATION OF BAKERS

Medical examination of bakers has our unqualified approval as a necessary incident to proper sanitation in the bakeshop.

III.

CELLAR BAKERIES

The Proposed Bill No. 26 would prohibit thereafter the opening of any cellar bakeries.

This proposal we believe to be unnecessary and detrimental to the public welfare, especially in this State.

The reasons for the proposal may arise from the report on bakeries and bakers in New York City by George M. Price, M. D., in which he enumerates 18 "evils due to location in cellars" (at p. 211) as follows:

| | |
|------------------------|---------------------------------|
| Peril from Fire. | Cleanliness of Utensils. |
| Defective Drainage. | Toilet Accommodations. |
| Inadequate Light. | Cleanliness of Utensils. |
| Defective Ventilation. | Handling of Product. |
| High Temperatures. | Cleanliness of Product. |
| Excessive Humidity. | Sleeping on Premises. |
| Proximity of Plumbing. | Presence of Domestic Animals. |
| Condition of Surfaces. | Presence of Vermin and Insects. |
| Washing Facilities. | Safety of Product. |

With the exception of the first, namely, Peril from Fire, there is no one of these evils which is peculiar to cellar bakeries as distinguished from other bakeries wherever located.

Certainly Defective Drainage, Proximity of Plumbing, Condition of Surfaces, Washing Facilities, Dressing-rooms and Toilet Accommodations are matter of structural arrangements which are dealt with fully and adequately under existing laws in connection with cellar bakeries as well as any other bakeries. Defective Ventilation and High Temperature and Excessive Humidity which go with it are just as capable of satisfactory and healthful handling in cellar bakeries as in other places of employment underground. These three enumerated evils, together with Inadequate Light are to-day entirely mastered in buildings constructed with several floors below the level of the curb, and used not only for mercantile purposes, but as well for restaurants, dining-rooms and kitchens. It would be in absurd disregard of all the startling advances made in mechanical engineering, blower and ventilating systems, forced draught and heated and cool air apparatus, and

the perfection of lighting arrangements, to say that the evils enumerated of this character as applied to cellar bakeries should work an abolition of them.

The matter of Cleanliness of Utensils, Handling of Product, Sleeping on Premises, Presence of Domestic Animals, and Presence of Vermin and Insects, is simply a question of enforcing proper rules and regulations which should apply equally to all bakeries as well as to cellar bakeries. The existence of these evils is not to be excused in cellar bakeries as contrasted with other bakeries, but conversely the existence of these evils in cellar bakeries, when they can be eradicated in them as well as in other bakeries, cannot be made a ground for abolishing cellar bakeries.

Peril from Fire and the attendant enumerated evil, Safety of Product, has superficially been regarded as applying more to cellar bakeries than to other bakeries, but even here an examination of statistics fails to bear out any such conclusion.

It appears from the report of the Committee on Fire Patrol of the New York Board of Fire Underwriters for the years 1898, 1900, 1902 and 1903 that the percentage of fires in buildings in which there is a bakery, as compared with the total number of fires, is less than one per cent. Of these fires in buildings in which a bakery is located less than one-half originated in the bakery itself. But, more directly, the Secretary of New York State Master Bakers' Security Association, furnishes statistics showing that the total losses through fires in 214 bakeries in this City, carrying about \$750,000 of insurance, during a period of nearly two years were \$150, confined to awnings.

In the absence then of any prevailing reason for the abolition of cellar bakeries the right of the individual to engage in the baking business where he pleases must be respected, so long as it does not contravene public health.

There are strong reasons of public policy why this right should not be interfered with, especially in this City.

From the very nature of the baking business, and the character of bakery products, customers are best served by being most quickly and most directly served. Most distinctively we like our bakery products fresh. This can only be attained by close

proximity between the baker and the consumer. The bakery business is not a business which lends itself to concentration in manufacture. The consuming public being widely distributed, the producing centers must be widely distributed. And yet the unavoidable result of abolishing cellar bakeries will be to reduce materially the number of bakeries, and to that extent concentrate the manufacture of bakery products in fewer hands. Now to the extent that concentration of manufacture may be brought about by an economic combination of units of production, the law may not interfere up to the point where such concentration results in the control of the industry. But certainly, on the other hand, any public body should be very slow to recommend a step in direct furtherance by law of such concentration of manufacture.

With the prevailing high rents and high valuations upon property, if a wide distribution of baking centers is to be maintained, it must in many cases be maintained in so-called cellar bakeries, always assuming, of course, that these places of manufacture meet every reasonable requirement of public health. To forbid them is depriving the individual of a right safeguarded to him by the Constitution of the United States, and would be in direct violation of the fundamental doctrine of competition, which still to-day is accepted as a sound common law doctrine.

Respectfully submitted,

NEW YORK RETAIL BAKERS' ASSOCIATION

By ANDREW WALLACE,
ELLWOOD M. RABENOLD,
Counsel.

FRANK P. HILL
Legislative Committee.

V

Memorandum on Fire Hazard

BY THE CIVIC ORGANIZATIONS' CONFERENCE ON PUBLIC SAFETY,
NOVEMBER 29, 1912.

The Civic Organizations' Conference on Public Safety has met five times during the last six weeks for the study and consideration of such proposed legislation of the New York State Factory Investigating Commission as deals with matters of fire prevention and building construction. This conference has included representatives of the following bodies:

Allied Real Estate Interests (Mr. Robert E. Simon).

American Institute of Consulting Engineers (Mr. Eugene W. Stern).

Brooklyn Chapter American Institute of Architects (Mr. Dudley McGrath).

Brooklyn League (Mr. John F. Geis).

Citizens' Union (Mr. Joseph O. Hammitt).

City Club of New York (Mr. Francis D. Pollak and Mr. Joseph M. Price).

Committee on Safety (Mr. John A. Kingsbury and Miss Frances Perkins).

National Board of Fire Underwriters (Prof. I. H. Woolson).

New York Board of Fire Underwriters (Mr. F. J. T. Stewart).

New York Chapter American Institute of Architects (Mr. Robert D. Kohn).

New York Society of Architects (Mr. Oscar Lowinson).

Joint Labor Conference on Workmen's Compensation (Mr. F. S. Tomlin).

Committee of Lawyers Acting as Advisors to the Counsel of the State Factory Investigating Commission (Mr. Walter Lindner).

The conference has authorized its secretary to make the following statement to the New York State Factory Investigating Commission in regard to the proposed legislation which it has considered:

1. The Bills as at present drafted do not provide adequately for the protection from fire of factory workers and factory prop-

erty. This is because at present no Bill relating to the requirements for construction of new factory buildings has been drafted.

2. This conference desires opportunity to study any such Bill before it is presented to the Legislature and cannot make its endorsement of the Commission's proposed legislation final until such a Bill fixing the minimum standards for new construction work has been submitted.

3. The conference finds itself in accord with the purpose and principle of the five Bills relating to fire prevention and building construction (I — to amend the labor law, in relation to fire prevention in factories; II — to amend the labor law in relation to fire alarm signal systems and fire drills; III — to amend the labor law in relation to automatic sprinklers; IV — to amend the labor law, in relation to stairs and doors, and fire escapes and exits; V — to amend the labor law, in relation to the limitation of the number of occupants in factories), but believes that these Bills can be improved both in form and content. Herewith is attached a memorandum in regard to each Bill, embodying the opinion of this conference on each Bill.

Bill I — To amend the labor law, in relation to fire prevention in factories:

Since baled waste material, if properly stored, does not constitute a fire hazard and since in many industries this waste is marketed in large quantities only, it is recommended that distinction be made between loose and baled waste in requiring the removal of the same from factories.

The following draft meets with the approval of this conference:

Beginning at page 2, line 3,—“No loose waste material, cuttings or rubbish shall be permitted to accumulate on the floors of any factory but shall be removed therefrom not less than twice each day. All such loose waste material, cuttings and rubbish shall be entirely removed from a factory building at least once each day. *Baled waste material in fireproof buildings if stored in fireproof enclosures may remain stored therein and must be removed at least once each month.*”

Since in many factories it is desirable that the employees be allowed to smoke during the noon hour, and since in connection

with welfare work provision for this is often made, it is recommended that exception to the law prohibiting smoking in factories be made when provision has been made for smoking under conditions which do not constitute a fire hazard.

The following draft meets with the approval of this conference:

Paragraph 3, beginning with line 12,— “Smoking in any factory is prohibited *except in a room specially designated for the purpose and not used for manufacturing or storage purposes*. A notice of such prohibition shall be posted in every entrance hall, elevator car, and every workroom in such factory in English and also in such other language or languages as the fire commissioner of the city of New York in such city, and elsewhere in the state the fire marshal, shall direct. The fire commissioner of the city of New York in such city, and elsewhere, the state fire marshal shall enforce the provisions of this subdivision.”

Bill II — To amend the labor law, in relation to fire alarm signal systems and fire drills:

The requirements for fire drills as made by this Bill do not seem to this conference sufficiently specific to insure the best results and actual safety to all occupants of factory buildings.

The following draft meets the approval of this conference on that point:

Beginning line 12, page 2:

2. In every factory building over two stories in height a fire drill of all the occupants of such building shall be conducted at least once in every month and shall be subject to the approval and supervision of the local fire departments or one of its officers. *A fire drill shall be so arranged as to conduct every occupant of such building within three minutes after the sounding of the alarm; to the street, or to an open court having direct means of egress to the street by means of an alley or fireproof passage, or to any portion of the same or an adjoining building which has independent means of egress to the street and which is separated vertically from the section of the building in which the alarm is first sounded, by means of a standard fire wall, the only openings in which are guarded by self-closing fire doors.* A demonstration

of this fire drill shall be given upon the request of *an authorized* representative of the fire department of the city or town in (continue with line 18 of original draft).

Bill III — To amend the labor law, in relation to automatic sprinklers:

In the opinion of this conference the automatic sprinkler is so valuable a means of fire prevention that it should be required in more buildings than those specified in this Bill.

The following draft meets the approval of this conference on that point:

Page 1, line 6 and page 2, line 2 — substitute the following:

In every factory building over fifty feet in height the owner of said building shall install an automatic sprinkler system throughout the same.

In the opinion of this conference, when discretionary power in regard to sprinklers or other appliances is given to administrative officers, requirement should be made for publicity in regard to all standards and rules established by them in the exercise of such discretionary power.

The following draft meets the approval of this conference on that point:

Page 2, lines 9, 10 and 11 — add:

“All standards and requirements for such construction established by said officials shall be published, in the city of New York in the City Record, and elsewhere throughout the state in such publications as may be designated by the Governor of the State, and no changes shall be made in these requirements and standards without public notice and public hearings.”

Bill IV — To amend the labor law, in relation to stairs and doors, and fire escapes and exits:

In the opinion of this conference this Bill should be entirely redrafted. This conference wishes to indicate the following points in which, in its opinion, this Bill is deficient:

1. This Bill does not make a clear distinction between the requirements for new buildings and those for existing buildings.

2. The kind of fire escape described by this Bill is not a good or safe means of exit, and should be recognized as a permissible means of egress from any building only in case no better means of egress is possible in that building.

3. In requiring two means of vertical egress from factory buildings there is no allowance for a smoke-proof tower, or enclosed staircase as a substitute for a fire escape.

4. While the title of this Bill includes stairways, the subject matter pertains almost exclusively to fire escapes, exit lights, fire doors, etc. The Bill is deficient in provision for stairways and their construction.

(a) The Bill makes no requirement for the fireproof enclosure of stairways in buildings, and omits to require that such stairs be built of fireproof material.

(b) The Bill makes no requirement for a minimum width for stairways in new buildings.

(c) The Bill makes no provision for intermediate landings in the flights.

(d) Makes no prohibition of the building of 'winders' into new buildings.

(e) Does not require the continuation of stairs to the roof, except in the discretion of certain administrative officers.

(f) Does not provide that stairways in buildings shall lead directly to the first floor and open directly, or by means of a fireproof passage, on the street.

5. This Bill makes no requirement as to the width of doors and hallways at the street level. This is most important, as such doors and halls should not be less than the aggregate width of stairs which lead to these places from above.

6. No provision is made for fireproofing elevator shafts.

7. This Bill does not regulate the use of revolving doors as exits. In the opinion of this conference they should never be allowed in buildings except when they are immediately adjacent to ordinary swing doors.

Criticism of details at present included in text of Bill IV:

Page 1, line 9.—Instead of 'plastic material' substitute (non-slipping surface).

Page 2, line 13.—No doors should open directly upon a stairway, but should open upon a platform or landing equal in width to at least the width of the door.

Page 3, line 22.—The words "every floor of" should be inserted before the word 'every' and the words (building used for manufacturing purposes) substituted for 'factory'—making this line read: *Every floor of every building used for manufacturing purposes* in this state two stories or over in height shall — etc.

Page 3, lines 23 and 24.—The wording of this paragraph would apparently permit two fire escapes as the only means of exits from the floor of the factory. Of course this was not the intent, but the wording is ambiguous.

Page 3, line 25.—Add (fireproof enclosed) before the word 'stairways.'

Page 4, line 5.—The standard for safe egress is not established in this Bill. Such broad discretionary powers and such responsibility should not be placed upon administrative officers, unless provision is made for publication and public hearings upon such standards.

Page 4, line 19.—If this type of stairway is required the conditions under which it is to be used should be specifically stated, rather than 'wherever practicable.' The terms 'continuous run' and 'straight run' are not defined and are ambiguous.

Page 4, line 21.—Omit the words 'windows or.'

Page 4, line 23.—Balconies should project a foot beyond window openings to furnish space in which fire shutters may be swung, also to prevent congestion by overcrowding on the balcony.

Page 5, line 1.—After 'openings' add (on the level of the floor and of the balcony).

Page 5, line 9.—There is no requirement for the width of these stairs, which is an important factor in their capacity. The relation of width of tread to height of riser is unnatural and not con-

ductive to safety. Better make it minimum 8 inch tread and maximum 8 inch rise.

Page 5, line 24.—After 'street' add "and independent of other exits from the building."

Page 6, line 24.—Provision should be made to prevent the window sill being more than seven inches above the balcony upon which it opens.

Page 6, line 10.—Omit the word 'windows.'

Page 7, lines 4 to 10.—The requirement for egress by way of the roof should be established and not left to the discretion of administrative officers.

Page 7, lines 21 and 22.—'Stairways' should be made (stairway) and the words (or elevator shafts) should be inserted after it. Then change the wording in balance of the paragraph to agree with this alteration. It is just as important that elevator shafts be fully enclosed with fireproof material as that stairway shafts be so enclosed. Every precaution possible should be taken to prevent the transmission of fire from floor to floor.

Page 8, line 25.—It is very doubtful whether four inch block partitions should be permitted for enclosure walls for stairway and elevator shafts. Certainly they should not be permitted over eighteen feet in height between floors, and the steel work which supports and reinforces them should be fully protected by fireproof material. Partitions as thin as this are naturally very unstable and easily thrown down by expansion on attack by fire, and this danger is often increased by the rapid expansion of the steel frame work into which they are usually built. We believe it to be far safer to require that such block partitions should be not less than six inches in thickness.

Page 9, line 3, and page 10, line 20.—No interior windows should be permitted in stairway or elevator shaft enclosures. Even when such windows are of wired glass in metal sash, they are an unnecessary menace because they will radiate a scorching heat and are subject to melting from a hot fire.

Page 10, line 10.—Add after the word 'street' (independent of other means of exit).

Bill V — To amend the labor law, in relation to the limitation of the number of occupants in factories:

This conference approves the principle of this Bill and submits the following suggestions designed to strengthen it:

1. This Bill does not require the enclosing of stairways and stair halls with fireproof partitions. This should be done, no matter what the occupancy. (Page 2, line 5, and on.)

2. The requirements for subdividing fireproof partitions (p. 3, line 2) are not specifically stated in the Bill, and should be set forth here.

3. Any type of exit which is required or approved should be allowed to increase the occupancy of a building up to its capacity.

Line 2, page 2, should read "Width of stairway or other approved exit provided for such floor."

4. Page 5, line 22.— A better description of interior finish would be "*of incombustible material.*"

5. The enclosing of the balconies connecting adjoining buildings (p. 4, lines 10 to 12) in fireproof material is not necessary or desirable for such form of horizontal exit, provided that all windows and openings giving on such balconies or directly below such balconies are encased with metal sash and have wired glass where glass is used. To require the fireproof enclosure of such balconies might be to discourage the building of one of the most practical and cheapest forms of horizontal exits on existing buildings, and to the defeat of the real object of the Bill.

6. Page 5, lines 1 to 7.— Any provision for occupancy other than those designed for safety should be based on ventilation and light requirements and so should be requirements for a certain number of cubic feet per person and should not be included in this section of the labor law.

7. Page 5, line 16.— The term "approved fireproof partitions" is here used, but it does not appear that they are elsewhere defined, hence it is not clear what is intended.

8. No increase is allowed in fireproof buildings where certain floors, in order to increase their occupancy, have been divided by

"fire division partitions" which do not extend from cellar to roof throughout the building. In a fireproof building with incombustible floor finish and with metal or metal-covered window frames and sash (automatically closing, with wired glass glazing and metal or metal-covered frames, trim, casings, etc.) throughout, where certain floors are divided by partitions of brick, terra cotta blocks, or concrete, not less than four inches thick, with all openings protected by fireproof self-closing doors, there might well be an allowance for additional occupancy on those floors so divided.

9. There should be a reduction in occupancy, possibly 25 per cent. if any of the stairways in a building have steps of the type known as "winders."

The Civic Organizations' Conference on Public Safety endorses Bills I, II, III and V with the changes and additions suggested in this report.

While recognizing that Bill IV contains many items which are distinctly valuable and which should become law, this conference wishes to postpone action in regard to that Bill until such time as it has been redrafted and appears in its final form.

It is suggested that, since a large number of these Bills must be enforced by the Fire Department in the city of New York, some provision should be made for that enforcement which is analogous to the provision suggested by the Factory Commission for the exercise of discretionary power in the Labor Department by an advisory board. To this end it is suggested that the Factory Commission present to the Legislature amendments to the Fire Prevention Law (Chapter 899, Laws of 1911, as amended by Chapter 458, Laws of 1912) which shall create some such advisory committee for the Fire Department, and that this committee be charged with the duty and be given the power of publishing regulations and establishing standards. Such an advisory committee might well consist of the Building Superintendents of the five Boroughs of Greater New York, and the Fire Commissioner. All standards fixed and regulations made by this Committee should be published in the City Record and be subject to public hearings, and no changes should be made in these standards without publication and opportunity for public hearings. It

is also suggested that the Factory Commission recommend to the Legislature changes in the method of appointing members of the Board of Survey provided for in the Fire Prevention Law. One member of the Board of Survey should be an architect or builder of at least ten years' experience, *chosen by the owner of the building under discussion.*

If these two recommendations are adopted by the Factory Commission it is believed that the enforcement of the legislation proposed by the Commission will be made simpler and more effective in the City of New York.

Respectfully submitted,

(Signed) FRANCES PERKINS,

Secretary.

ADDITIONAL POINTS MADE BY THE COMMITTEE ON SAFETY.

1. No increase in occupancy because of automatic sprinklers (Bill V).
2. Watchmen be required when horizontal exits to adjoining buildings are used (Bill V).
3. Special regulations for fire safety in extra-hazardous industries. Such regulations to be made by Advisory Board of Labor Department after special study of each industry.
4. That regulations for new buildings be drafted in accord with most advanced standard, and provision be made for safety of all *possible* occupancy.

VI

Homework in Tenements

THE BROOKLYN AUXILIARY OF THE CONSUMERS' LEAGUE OF THE
CITY OF NEW YORK

December 12th, 1912.

HON. ROBT. F. WAGNER, *Chairman Committee on Safety:*

DEAR SIR:—

All women interested in wages and working conditions are following closely your investigations of factories, canneries and licensed tenements throughout the State.

In addition to other ills in tenement house manufacture is the spread of contagious diseases of which you have had examples in the testimony before you.

During the period from Sept. 1st to Dec. 11th, 1909, the Brooklyn Auxiliary compared the records of the Board of Health of this Borough for 5,195 houses licensed for manufacturing.

For these two and a half months, there were 80 cases of diphtheria, 80 of measles, 71 of scarlet fever and 62 of tuberculosis—293 in all. That these diseases spread and congest is shown by the fact that one of these houses had five cases of scarlet fever and two of diphtheria in September and two of scarlet fever in October. Two other houses within a short distance had each a case of scarlet fever and another one had both scarlet fever and diphtheria the same day. These examples might be multiplied indefinitely.

In another of these licensed houses, sheltering seven families, four children under two years died of scarlet fever in eleven weeks.

That disease germs are carried in many directions by work done in these houses is a foregone conclusion.

The long hours of uncontrolled labor for women and little children—often under far worse conditions than those of regulated factories, are as potent in undermining health and strength as contagious disease.

Last year, from Feby. 1st to Dec. 1st, in 5,114 licensed tenements, there were 1,186 cases of contagious diseases reported by

the Board of Health in this Borough, an average of over one to every four houses. In many of these, however, a second case followed within a month.

It is no wonder that the Consumers' Leagues are anxious for legislation that will abolish the tenement house manufacture and keep workers in factories that can be controlled.

Brooklyn's good factory buildings are increasing, and with the air and space available in its extended territory, the days of the tenement makeshift will be numbered when public opinion demands it.

Respectfully yours,

MARY H. LOINES,
Chairman.

VII

Memorandum Submitted by Needle Trades Associations

NEW YORK STATE FACTORY INVESTIGATING COMMISSION, 22
EAST 17TH ST., NEW YORK CITY.

GENTLEMEN:

The undersigned represent the following Associations:

The Cloak, Suit & Skirt Manufacturers' Protective Association,
Clothiers' Association of New York,
Associated Fur Manufacturers, Inc.,
Wholesale Men's Furnishing Goods Association,
Dress and Waist Manufacturers' Association.

These Associations cover substantially all of the factories embraced in the needle-working industries in and about New York City and a large majority of all the factory workers in New York City.

In the brief time that we have had to consider the legislation proposed by your commission, we have found the following points that we desire to present to your body for careful consideration.

The organizations we represent are desirous of aiding your commission in every way. Our members do not operate unsanitary shops nor shops in which the lives of the workers are not protected; they desire earnestly to consider the welfare of their employees in all of its manifestations and wish to co-operate with your commission in establishing standards that will make for better and greater safety of health and life. It is with this in view that the following suggestions are made:

1. We observe that, in the bills presented, detailed provisions are outlined for *existing* buildings, and reference is made to a *proposed building code* (not yet presented), which we assume will set forth the provisions for new buildings.

Your attention has probably already been drawn to the fact that the needleworking industries in and about New York City comprise upwards of 275,000 workers. While from the point of view of present enlightened public opinion, factory conditions for all of these employees may not be entirely satisfactory, it is but

fair to employers to recognize that the buildings constructed within recent years were actually constructed with the expectation that they would be safe for housing operatives; leases of buildings and floors of buildings have been made in good faith and business undertakings based in reliance upon existing laws. Accordingly, if changes are made, they should be made under such circumstances as least seriously to injure these industries — the largest in our State.

If the regulations for the erection of new structures were known, opportunity would then be afforded for the immediate construction of new factory buildings adequately equipped to safeguard the lives of the workers, and opportunity would thereafter be afforded for those now occupying buildings not so safely equipped to move their factories into the newer structures. We assume, of course, that your commission is desirous of accomplishing this result at the earliest practicable moment, for only by so doing can it really serve the best interests of the factory workers. Even assuming that the modern loft building can be made readily to conform to the rigorous standards outlined in your legislation, it would not be wise policy to drive out the occupants of existing structures of a lower grade until provision is made for the newer buildings into which these occupants are to go. Accordingly, we believe that the first step in constructive legislation should be, provisions for the making of standards that are certain and clear, upon which real estate owners may immediately proceed to erect more structures of the kind that will comply with law and into which those now occupying structures of sub-standards may move. With this end in view, we are of the opinion that sufficient time should elapse to enable these provisions, first, to be formulated, and, second, to be carried into execution. Accordingly, we recommend that whatever legislation you propose regarding the requirements for the erection of new factory buildings shall be enacted simultaneously with legislation relating to present factory buildings and that the provisions of the latter legislation shall become effective, say, two or three years hence — during which time opportunity for the erection of the new buildings will have been given. We do not see how otherwise the admirable result your commission is endeavoring to accomplish can be accomplished without grave injury to the best interests of the State.

II. We think the drafting of a new building code is a matter that requires very careful consideration and the aid of the best experts, and we think it would be better done by a commission appointed for the purpose than by the legislature directly. We should be very glad to co-operate with such a commission in the formulation of legislation to cover the needs of the situation, and we should be glad to put at the disposal of such a commission such facts and figures as may bear on the subject, together with our practical knowledge of the situation.

III. Coming now to the consideration of the bills proposed, we have the following specific criticisms to make:

As to Bill No. 1, we suggest that provision be made for the storing of waste material in fire-proof receptacles and their removal at least once a month.

With regard to the provisions relating to smoking, although the language would seem to inhibit only smoking in the factory itself, the definition of a "factory" in Bill No. 9 would seem to cover also the salesroom and office, since this is part of the "establishment." We think that the prohibition of smoking should be limited to the workshop itself, and that the proposed legislation should be amended accordingly.

As to Bill No. 2, we believe that, with reference to fire drills, provision should be made so that authority shall be vested somewhere to organize these fire drills for entire buildings, so that the occupants of each floor may be compelled to co-ordinate their drill with the drill of other occupants in the same building. We think, also, that provision should be made imposing upon employees the duty of conforming to the fire drill — our attention has been drawn to cases where employees have refused to participate in the drill.

As to the installation of fire signal systems, we believe that this can only be made effective by imposing the duty upon the landlord of the building; the frequent change of tenants would otherwise make it impossible for execution.

As to Bill No. 3, we think this is a good bill.

As to Bill No. 4, we are in favor of its general purpose, but we think the details should be worked out by a body of technical

experts such as could be employed by a State Commission. We do not think that such details as these should be made the subject of legislation. For example, we could present very strong considerations to your commission against the enactment of such provisions as are contained in lines 8 and 9 on page 1 — the use of rubber, asphalt, or any plastic material upon steps might result in more accident than benefit to the people who use the steps. But this is a matter that ought to be carefully considered and discussed, and we do not believe the time is adequate for the proper consideration of this matter by the legislature. This bill is so full of minor details upon which laymen are not qualified to speak that it is impossible for any group of laymen to pass upon it at this time.

As to Bill No. 5, first of all, we call your attention to the fact that it does not make allowance for safe exits of a different kind than those provided in the bill. A reasonable allowance should be made for such exits.

This bill also fails to make provision for an allowance of additional occupancy where "fire-proof division partitions" not extending from cellar to roof throughout the building, are placed in fire-proof buildings. We suggest that, where floors are divided by partitions of brick, terra-cotta blocks, or concrete not less than 4 inches thick, with all openings protected by fire-proof, self-closing doors in a fire-proof building, there should be allowance for additional occupancy, based upon the number of persons who can enter the enclosed space with safety, with a fair allowance for light through the use of non-cumbustible wired glazing with metal covered frames.

We believe that the allowance for sprinklers should be retained in the bill.

We believe that allowance should be made for stairways to the roofs of the fire-proof buildings.

We believe that an allowance should be made for fire-escapes outside the building not enclosed in fire-proof partitions.

We believe that an allowance should be made for elevators enclosed in fire-proof partitions and opening directly into the body of the floor. Experience has shown that such elevators are a decided factor in permitting occupants to escape in times of fire.

In non-fire-proof buildings, the duty to provide a fire-proof wall from cellar to roof should be imposed upon the landlord. The tenant has no power to construct such a wall and cannot be relieved from his lease, because of this legislation, if enacted; he is compelled to continue occupancy of the premises, yet without relief from the burdens imposed upon him by this statute. In case he complies and subsequently moves, he has been put to an expense that in the end benefits the landlord.

On page 5, lines 1 to 7.— These provisions for occupancy seem to be based upon other considerations than safety. We think it is a mistake to assume that 36 square feet is either sufficient or insufficient, without taking into account the matter of light and ventilation, and we think this would naturally lead to a consideration of cubic feet per person rather than square feet of area space. We think this is a matter that should be taken up by the body of experts who should consider the details of regulations.

In general, while we are in favor of a restricted occupancy, based upon a fair protection of the employees, we believe that the bill in the form proposed will work great disadvantage to our trades, requiring manufacturers almost to double their area capacity in order to employ the usual amount of people that their business demands. We respectfully submit that any such procedure would not only be of great injury to the trade, but to the State, by forcing a number of these establishments to remove their factories to other States.

If it were absolutely essential to the safety of our employees, we could not object; but since safety of life can be had without destroying the industry, we submit that you should consider these details as of vital importance.

We have not had the time to consider in detail all the remaining bills, but we respectfully call your attention to the provisions contained in Bill No. 22 requiring a wash sink for every 10 employees. Investigations has shown us that not more than 20% of the employees of any factory ever make use of wash sinks, and that with the ordinary facilities existing in up-to-date factories, there has been no complaint of lack of opportunity for cleanliness. We believe that one wash sink for every 50 employees would cover the ground as fully as needs be covered.

We have not been able to give thorough consideration to the proposed amendment in your Bill No. 15, but we are giving study to this bill, and hope shortly to be able to make helpful suggestion.

In closing we reiterate what we have said in the earlier portion of this communication. It is our earnest desire to aid your commission in every possible way, and we are hopeful that this communication will not be taken in any other spirit. You expect from us frank expression of those considerations with which we are familiar, in order that your commission may be fair to all interests. We are assuming that your commission desires the maximum of safety, and the minimum of injury to the industries of this State.

Respectfully submitted,

(Signed) EUGENE S. BENJAMIN,

President, Clothing Trade Association.

CHARLES M. COHEN,

*Of the Cloak, Suit and Skirt Manufacturers'
Protective Association.*

JAMES R. KEISER,

*President, The Wholesale Men's Furnishing
Association, Incorporated.*

SAMUEL FLOERSHEIMER,

*President, Dress and Waist Manufacturers'
Association.*

LOUIS MALVIN,

Of the Associated Fur Manufacturers, Incorporated.

VIII

Resolutions

RESOLUTIONS ADOPTED AT THE 32ND ANNUAL CONVENTION OF
THE AMERICAN FEDERATION OF LABOR, HELD AT
ROCHESTER, N. Y., NOVEMBER 11-23, 1912.

"WHEREAS, The Legislature of the State of New York has created a State Factory Investigating Commission, the members of which are appointed by the Governor, without compensation, to perform the service of making investigations of and exposing the evil conditions attending modern industry in the State of New York; and,

WHEREAS, As a result of the investigation of this Commission a number of remedial laws have been enacted by the Legislature of the State of New York; and

WHEREAS, As a result of the further work of the Commission it is expected that additional laws will be formulated and enacted by the New York State Legislature; therefore, be it

RESOLVED, That the American Federation of Labor in convention assembled most heartily approves and endorses the New York State Factory Investigating Commission and its work and not only recommends the continuation of the Commission, but that the several other States of our Union shall enter upon a similar line of work."

RESOLUTIONS OF CONSUMERS' LEAGUE.

I. WHEREAS, The Consumers' League of the City of New York recognizes the urgent necessity of progressive legislation for the protection of the 500,000 working women in this State, and for the efficient enforcement of such labor laws,

Be it Resolved, That the Consumers' League endorses the work of the Factory Investigating Commission, which for two years past has been engaged in a searching investigation and study of conditions of employment in this State, and

Be it Resolved, That the Consumers' League also endorses the bills proposed by the Commission for the radical reorganization of the Labor Department.

II. WHEREAS, The recent hearings of the Factory Commission has shown the labor of young children in canneries and in tenement house manufacture to be a scandalous abuse, and

WHEREAS, The preservation of the race demands the adequate protection of children up to the age of fourteen years at least,

Be it Resolved, That the Consumers' League endorse the Bill of the Commission, Senate Bill No. 101, which would entirely abolish such labor of children.

III. WHEREAS, The State Labor Department has the welfare of almost a million citizens in its care, and

WHEREAS, It can perform this service with a maximum of efficiency only if the Labor Commissioner is a man of high ability, experience and breadth of vision.

Be it Resolved, That the Consumers' League call upon the Governor and the several members of the Factory Commission to secure the appointment of a Labor Commissioner thoroughly qualified to hold this high office.

IV. WHEREAS, A period of rest at night for women employed in factories is essential to protect the health and morals of women, and in order to preserve their vitality as future wives and mothers, and has been recognized as such by international treaties in Europe prohibiting night work for women in industries,

Be it Resolved, That the Consumers' League endorse the Bill of the Factory Commission, providing for such a period of rest at night between 10 P. M. and 6 A. M.

RESOLUTIONS OF WESTERN NEW YORK HORTICULTURAL SOCIETY.

Rochester, N. Y., December, 14, 1912

HON. ROBERT F. WAGNER.

Chairman, The New York State Factory Investigating Commission, New York City.

DEAR SIR:—

At the fifty-eight annual convention of this Society, just closed, held in the city of Rochester, N. Y., the following resolution was unanimously adopted:

"WHEREAS, Through notices in the daily press and through other sources, it has been brought to our attention that various

alleged abuses have grown up in the fruit and vegetable canning industry of the State of New York; and

WHEREAS, We have also seen in the daily press statements to the effect that you have expressed the intention of recommending to the Legislature the passage of laws restricting the hours of labor for women in such canning factories; and

WHEREAS, The canning factories of the State of New York are large consumers of the crops which we grow,—berries, cherries, currants, peaches, pears, plums and apples, and whilst not wishing to condone evils that may need correction by the legislative action; be it

Resolved, That we, members of the Western New York Horticultural Society, realizing the perishable nature of fruits and vegetables which constitute the raw materials of canning factories; and also realizing that frequently climatic conditions force these crops upon them faster than can be taken care of in the ordinary working day, trust that you will not recommend such conditions upon the fruit canners as will destroy or materially reduce the large and growing demand which they have been making for our products."

Let me add, sir, that this Society is composed of the leading fruit-growers of the Empire State, having a membership of nearly fifteen hundred, with W. C. Barry, head of the firm of Ellwanger & Barry, of this city, as its president for the past quarter century.

Very truly yours,

JOHN HALL,
Secretary-Treasurer.

UNIV. OF MICHIGAN,

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To renew the charge, book must be brought to the desk.

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